

**HERBERT HOOVER DIKE MAJOR REHABILITATION
MARTIN AND PALM BEACH COUNTIES**

**ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT**



**REACH 1 SEEPAGE BERM
AND
REACH 1A TEST CUTOFF WALL**

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**ENVIRONMENTAL ASSESSMENT
REACH 1 SEEPAGE BERM DESIGN AND REACH 1A CUT-OFF WALL
MARTIN AND PALM BEACH COUNTIES, FLORIDA**

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APPENDICES

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Appendix B – CZMP Evaluation
Appendix C – Mitigation Assessment
Appendix D – Pertinent Correspondence

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LIST OF ACRONYMS

AA	Assessment Area
Act	Flood Control Act of 1948
bls	Below Land Surface
BMPs	Best Management Practices
CFR	Code of Federal Regulations
CAR	Coordination Act Report
C&SF	Central and Southern Florida Project
Corps	US Army Corps of Engineers
dB	Decibels
DDR	Draft Design Report
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EAA	Everglades Agricultural Area
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FFWCC	Florida Fish and Wildlife Conservation Commission
FGFWFC	Florida Game and Freshwater Fish Commission
FMSF	Florida Master Site File
FNAI	Florida Natural Areas Inventory
FNST	Florida National Scenic Trail
GLOTA	Greater Lake Okeechobee Tourist Alliance
HHD	Herbert Hoover Dike
HGS	Hurricane Gate Structure
IPET	Interagency Performance Evaluation Taskforce
Lake	Lake Okeechobee
LOST	Lake Okeechobee Scenic Trail
MRR	Major Rehabilitation Report
MWL	Minimum Water Levee
NEPA	National Environmental Policy Act

NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act of 1966, as amended
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PSD	Prevention of Significant Deterioration
SFOO	South Florida Operations Office
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Officer
SPF	Standard Project Flood
TD	Toe Ditch
UMAM	Uniform Mitigation Assessment Method
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VE	Value Engineering
WCA	Water Conservation Area

**FINDING OF NO SIGNIFICANT IMPACT
HERBERT HOOVER DIKE REACH ONE
MARTIN AND PALM BEACH COUNTIES, FLORIDA**

Based on the information analyzed in this Environmental Assessment (EA) and the July 2005 Environmental Impact Statement (EIS), reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an EIS. Reasons for this conclusion are, in summary:

- a. The proposed action would occur within the existing right-of-way. The Record of Decision for the Final EIS (July 2005) approved implementation of the selected plan within this area.
- b. The goal of the rehabilitation of the HHD is to reduce the risk to public safety and health associated with the stability of the dike by implementing the recommended plan. Levee seepage and stability have a direct effect on the capability of the levee to provide authorized protection. The Flood Control Act of 1948 authorizes levee operation and maintenance as proposed in the preferred alternative for the renovation of the HHD in Reach 1.
- c. This EA has been circulated with a proposed Finding of No Significant Impact (FONSI) for public and agency review and coordination in compliance with the National Environmental Policy Act. No significant issues were raised regarding project impacts to the natural or human environment.
- d. Wetlands landward of HHD within the existing right-of-way will be impacted. Although these wetlands are not considered a high quality ecosystem, a variety of wading birds, small fishes and invertebrates utilize the area. The U.S. Army Corps of Engineers (USACE) has conducted compensatory mitigation for the backfill of Reach 1 wetlands landward of HHD within the existing right-of-way. Mitigation has been coordinated with the Florida Department of Environmental Protection and U.S. Fish & Wildlife Service.
- e. Adverse impacts to protected species are not anticipated. There is no critical habitat for listed endangered species along the landward toe of HHD. Listed species that might be observed in the region include wood stork (E), snail kite (E), eastern indigo snake (T), bald eagle (T), and Audubon's crested caracara (T). Special measures will be incorporated during project construction to avoid or minimize adverse effects to any listed endangered, threatened, or species of special concern that may be present (see Environmental Commitments, p.47). The USACE and the South Florida Water Management District (SFWMD) agree to maintain an open and cooperative informal consultation process with the U.S. Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission throughout the design, construction, and

operation of this rehabilitation project. The proposed action is in compliance with the Endangered Species Act.

- f. Minor impacts to fish and wildlife are likely to occur due to implementation of the preferred alternative. The foraging habitat for wading birds in the landward toe ditches would be reduced through implementation of this alternative. Considering the low quality of these ditches as foraging habitat and the availability of an extensive network of comparable ditches in the area, the project does not significantly impact fish and wildlife.
- g. No impacts to groundwater are anticipated from installation of the impervious, partially penetrating test cutoff wall in Reach 1A since the tip elevation does not extend down to the impervious barrier (the Hawthorne formation) which is at an elevation of approximately -200 ft. Also, the proximity of the test cutoff wall to the St. Lucie Canal in Reach 1A will replenish groundwater on the landward side of the test cutoff wall (p. 28).
- h. The USACE has coordinated a consistency determination under the guideline of the Coastal Zone Management (CZM) Act in the Final EIS, dated July 2005. The State has concurred with the determination (Annex D of the Final EIS, dated July 2005) that the proposed action is consistent with the State's CZM programs. We expect that the modified plan is likewise consistent with the Florida CZM program.
- i. The proposed action has been coordinated with the Florida State Historic Preservation Officer in accordance with the National Historic Preservation Act and the Archeology and Historic Preservation Act. Consultation with the State Historic Preservation Officer (SHPO) was initiated August 20, 1999. In a response dated August 7, 2005, the SHPO concurred with the Corps' no adverse effect determination on Reach 1. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places (p. 50). Conditions to protect undiscovered resources will be implemented as follows: Language will be included in construction contract specifications outlining the steps to be taken in the event that undiscovered historical properties are encountered. An informational training session, developed by a professional archaeologist, will be conducted for the contractor's personnel to explain what kinds of archaeological/cultural materials might be encountered during construction of the impoundment, and the steps to be taken in the event these materials are encountered. A professional archaeologist will conduct periodic monitoring of the project area during construction to determine if activities are impacting unanticipated cultural resources. The proposed action is consistent with these Acts.
- j. In compliance with the Clean Water Act, a water quality certificate will be obtained from the State. All State water quality requirements will be followed.

In view of the above and after consideration of public and agency comments received on the project, I have concluded that the proposed action for the rehabilitation of HHD will not result in a significant adverse effect on the human environment. This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed herewith.



Paul L. Grosskruger
Colonel, U.S. Army
District Engineer

3 May 07
Date

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HERBERT HOOVER DIKE ENVIRONMENTAL ASSESSMENT

Proposed Action: The proposed action includes construction of a partially penetrating test cutoff wall in Reach 1A and implementation of a partial seepage stability berm in Reach 1.

Purpose: The purpose of this document is to provide the decision maker with all necessary information to make an educated decision on the project. The Environmental Assessment covers regulatory requirements, anticipated impacts from implementation of the preferred plan, mitigation completed to offset any anticipated impacts, and public and agency views on the project.

Lead Agency: U.S. Army Corps of Engineers

Executive Summary

The Herbert Hoover Dike (HHD) was originally constructed as a series of embankments by local interests in 1915 around Lake Okeechobee to provide flood protection to the surrounding communities and controlled irrigation for local agriculturists. These embankments were improved to the current levee system by the U.S. Army Corps of Engineers (USACE) during the 1930s and 1940s, with major culvert modifications accomplished in the 1970s. Since then, the dike has been repaired as needed. Within the last couple of years, reactionary repairs to control seepage and sand boils have increased, indicating the need for major rehabilitation of the HHD. In response, the USACE produced a Major Rehabilitation Evaluation Report (MRR) on HHD with a Draft Environmental Impact Statement (EIS) in November of 2000. The MRR focused primarily on the development and evaluation of alternatives for the rehabilitation of Reach 1, with the intent to release a supplemental MRR for the remaining Reaches. In July 2002, a Value Engineering (VE) study was completed to further refine the engineering alternatives and attempt to limit the area of environmental impact of the preferred alternative. In addition, emergency repairs and early design documents modified the preferred alternative to further reduce project impacts on wetlands and fish and wildlife habitat. This modified design was presented as the preferred alternative (Alternative No. 4) in the “Herbert Hoover Dike Major Rehabilitation Evaluation Report Reach 1, Final Environmental Impact Statement, dated July 2005”. In the fall of 2005, the New Orleans’ levees failed following Hurricane Katrina. A performance evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System followed, resulting in the Final Report of the Interagency Performance Evaluation Task Force (IPET) in June 2006. The non-Federal sponsor also conducted a Technical Evaluation of HHD, released in May 2006. The USACE conducted an Independent Technical Review (ITR) on the rehabilitation of HHD in order to capture lessons learned from the IPET reports and other technical reports to ensure that the Corps had the best engineering solution to rehabilitate and reinforce the HHD.

The alternatives that are evaluated in this EA are: (1) No Action Alternative: continuation of present management practices without implementation of a rehabilitation alternative in Reach 1 and no physical changes in the study area, (2) Preferred Alternative: an impervious, partially penetrating test cutoff wall at the crest of the dike in Reach 1A and a stability seepage berm in

Reach 1 to reinforce the dike, and (3) Alternatives 1 through 4: considered in the July 2005 EIS. A future NEPA document will be prepared for a cutoff wall in Reaches 1B, 1C, and 1D. The preferred alternative design offers the best technology in industry to reduce seepage and piping immediately at the most critical areas of the dike as well as to offer stability and protection in the long-term. The stability seepage berm is a separable element; this means that it can be implemented in phases. This EA evaluates impacts that would result from implementation of a partial seepage berm within the USACE's existing right-of-way (ROW). The partial berm can provide immediate benefits by reinforcing the dike in Reach 1. However, implementation of the full seepage berm in combination with the cutoff wall will provide the resiliency, redundancy and robustness needed to offer the best, long term engineering solution.

Based on the analyses of the EA, the implementation of the preferred alternative will beneficially impact the public by increasing safety and health. Impacts are anticipated to the wetlands landward of HHD within the existing right-of way and the associated fish and wildlife that rely on this wetland habitat. The Corps has undertaken mitigation measures to offset any negative impacts associated with implementation of the selected plan.

**ENVIRONMENTAL ASSESSMENT
FOR
SEEPAGE BERM DESIGN AND CUTOFF WALL
HERBERT HOOVER DIKE
MARTIN AND PALM BEACH COUNTIES, FLORIDA**

1.0 PROJECT PURPOSE AND NEED

The Herbert Hoover Dike (HHD) consists of a series of levees, gated culverts and locks that encompass Lake Okeechobee. Construction of this dike began in 1915 as the first embankments around the lake were constructed by local interests and were primarily composed of muck, sand, shell, and marl from adjacent borrow canals. During the 1930s, a Federal interest was initiated as a result of the hurricane tides of 1926 and 1928 overtopping the original embankment and causing over 2,600 deaths. The River and Harbor Act, approved July 3, 1930, authorized the construction of 67.8 miles (109 kilometers (km)) of levee along the south shore of the lake and 15.7 miles (25.3 km) of levee along the north shore. Constructed by the Corps between 1932 and 1938, the typical crest height of these levees ranged from 32 to 35 feet (9.8 meters (m) to 10.7 m) above the National Geodetic Vertical Datum of 1929 (NGVD). A major hurricane in 1947 prompted the need for additional flood protection work in Florida. In response, Congress passed the Flood Control Act of 1948 authorizing the first phase of the comprehensive plan for flood protection and other water control. Additionally, major culvert modifications were accomplished in the 1970s. Since then, only as-needed repairs have been made to the HHD at locations where seepage and sand boils have been observed. Sand boils are indicators of the initiation of piping, which can lead to dike instability. Increased observances of these activities indicate that major renovations are now necessary, especially along the southern portion of HHD. An unreliable embankment system could allow for a failure of the system to contain lake waters. Such a failure could be devastating, resulting in human suffering, loss of life, immense property damage (including residential, commercial and agricultural) and destruction of the natural habitat.

1.1 PROJECT AUTHORITY

The Herbert Hoover Dike is a component of the Central and Southern Florida (C&SF) Project. The Flood Control Act (Act), approved by Congress on 30 June 1948, authorized the first phase of a comprehensive plan to provide flood protection and other water control benefits in central and south Florida. The Act included measures for improving control of Lake Okeechobee by constructing or modifying the spillways and other structures, and enlarging the Lake Okeechobee levees to provide the intended flood protection, water storage and water supply. Levee seepage and stability have a direct effect on the capability of the levee to provide the authorized protection. The Act of 1948 authorizes levee operation and maintenance as proposed in the preferred alternative for renovation of Reach 1 of the HHD. The authorized level of protection for the safety of the public corresponds to the Standard Project Flood (SPF) lake level, an elevation of 26.4 ft (NGVD 29).

1.2 PROJECT LOCATION

The existing HHD system is approximately 143 miles (230 km) long, and comprises five counties: Glades, Hendry, Martin, Okeechobee, and Palm Beach. The dike is divided into eight segments or “Reaches” for planning purposes. The focus of this EA is the southeastern segment, Reach 1, which is approximately 22.5 miles long, extending from the St. Lucie Canal at Port Mayaca, south to the Hillsboro Canal at Belle Glade (**Figure 1-1**). Reach 1 is further divided into four subreaches (1A, 1B, 1C, and 1D); **Table 1-1** displays the lengths of the four subreaches.

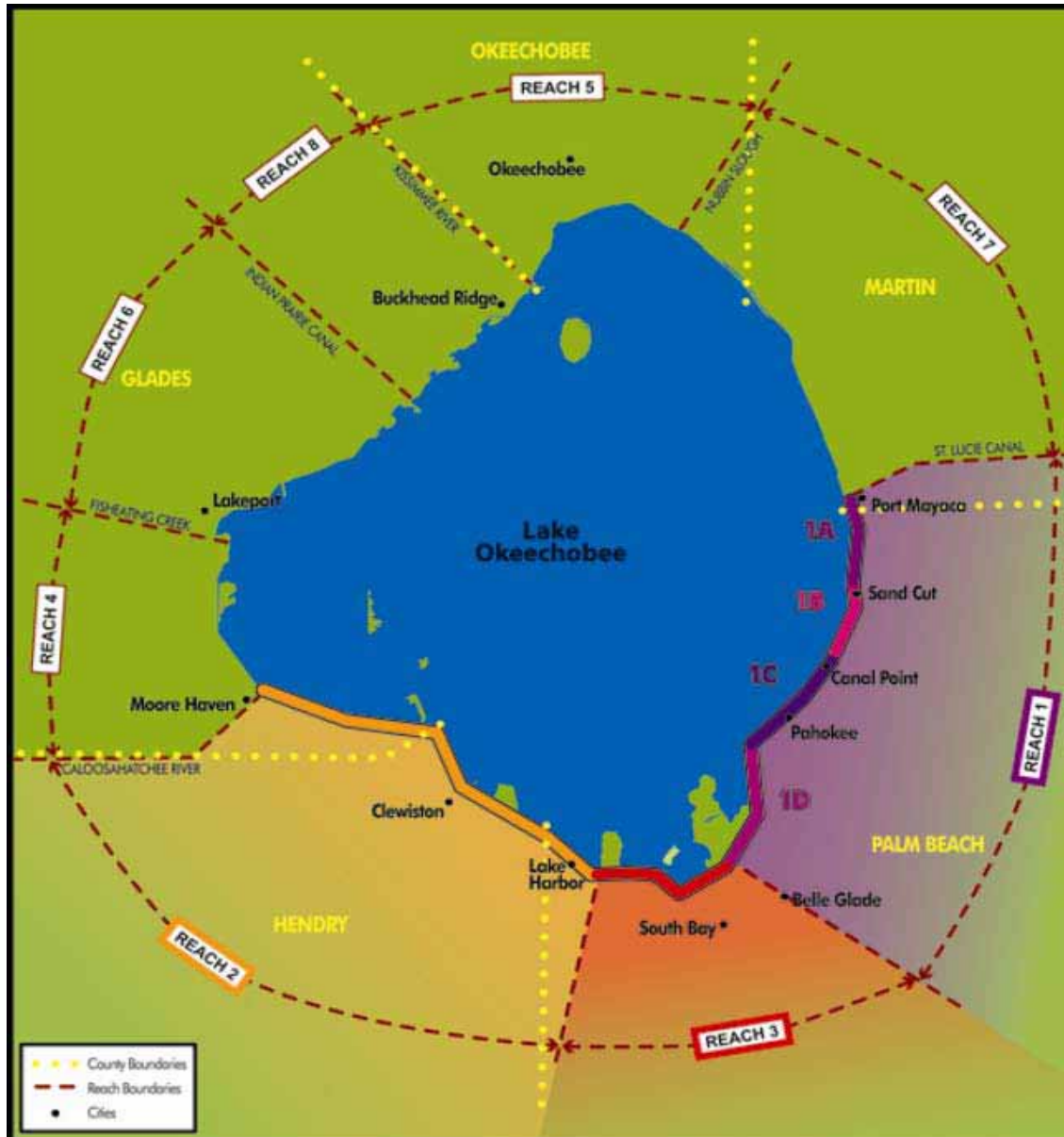


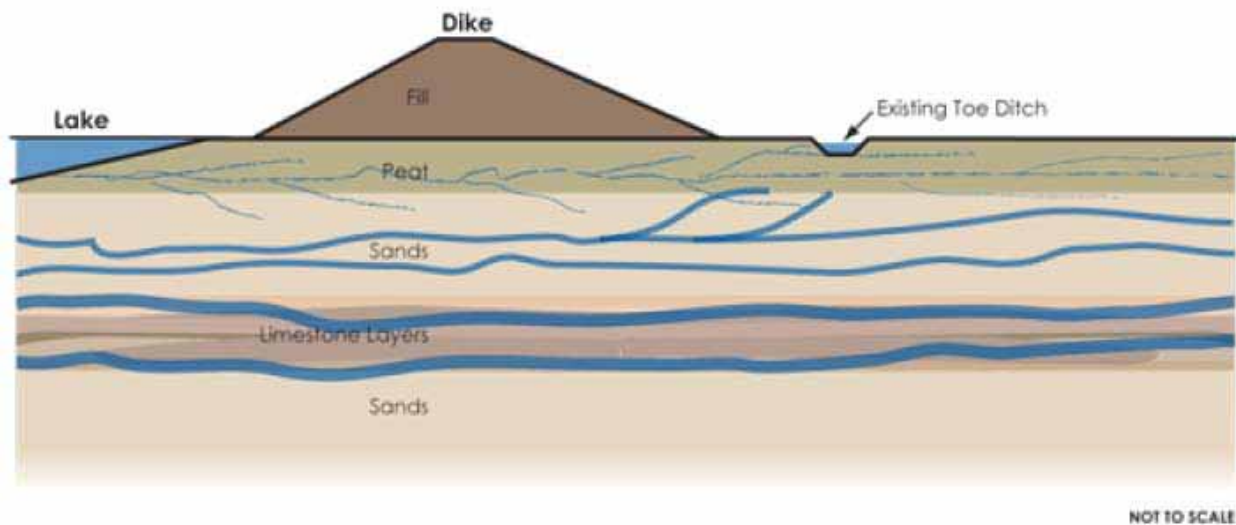
FIGURE 1-1: PROJECT LOCATION MAP

TABLE 1-1: REACH 1 SUBREACH LENGTHS

REACH 1 SUBREACHES	MILES
REACH 1A	4.9
REACH 1B	4.0
REACH 1C	6.2
REACH 1D	7.4
TOTAL	22.5

1.3 PROJECT NEED OR OPPORTUNITY

The Herbert Hoover Dike is constructed largely of local material (e.g., mud, muck, sand, shell fragments, and rock) with porous limestone bedrock underlying the levee. Seepage and sand boils have been observed along Reach 1 of HHD. When water travels from the Lake underneath or through the dike, it can carry material (mostly soils and sands) with it, eventually eroding a flow path underground for water to travel more easily through, this is known as piping. Piping is a progressively deteriorating process, typically initiated at the toe followed by continuing erosion backwards from the landside to the lakeside of the dike, resulting in an underground, open conduit between the lake and landside toe which typically leads rapidly to failure or breach of the embankment. **Figure 1-2** demonstrates how water flows or “seeps” from the Lake to the landward side of the dike.

**FIGURE 1-2: SEEPAGE AND PIPING UNDERGROUND**

A number of piping and sand boil occurrences have been observed along the HHD, these occurrences have required immediate action by the USACE South Florida Operations Office (SFOO) (**Figure 1-3**). The opaque, murky water is a result of the mixture of sands and soils in the water, representing erosion through underground piping. Once pipes have formed underground through erosion, increased observances of seepage are more likely because water will always travel the least resistance path. The most significant occurrences of piping were found along Reach 1 of HHD. Piping and sand boil occurrences have occurred when there is not a high water event, as shown in **Figure 1-4**. This is an evident concern and demonstrates the need for immediate repair and rehabilitation of the dike, especially in the most critical areas.

An unreliable embankment system, such as that which currently exists along Reach 1 of the HHD, could lead to a failure of the system to contain lake waters. Such a failure could be devastating, resulting in human suffering, loss of life, immense property damage (including residential and agricultural) and destruction of the natural habitat. A reasonable and effective rehabilitative effort is required to eliminate this possibility.



FIGURE 1-3: EMERGENCY SEEPAGE AND MANAGEMENT CONTROL IN TOE DITCH (1995)



FIGURE 1-4: ACTIVE SEEPAGE AND PIPING MANAGEMENT IN TOE DITCH (2003)

1.4 AGENCY OBJECTIVE

The Corps conducted a structural and stability analysis study on the HHD that culminated in a Major Rehabilitation Evaluation Report (MRR), dated November 2000 for Reach 1. The general goal of the HHD MRR was to provide a reliable embankment system around Lake Okeechobee to contain the lake waters for flood protection, water supply, and navigation. In July 2002, a Value Engineering (VE) study was completed to further refine the engineering alternatives and attempt to limit the area of environmental impact of the preferred alternative. In addition, emergency repairs and early design documents modified the preferred alternative to further reduce project impacts on wetlands and fish and wildlife habitat. This modification was presented as the preferred alternative (Alternative No. 4) in the “Herbert Hoover Dike Major Rehabilitation Evaluation Report Reach 1, Final Environmental Impact Statement, dated July 2005”. Subsequent to lessons learned from Hurricane Katrina and input from an external, independent team of scientists, the preferred alternative was modified to provide an engineering solution that would immediately address seepage due to piping at the most critical areas of the dike as well as provide a reliable, long-term solution for the rehabilitation of the HHD. See Section 2.0 for a discussion of alternatives that were previously considered and the Preferred Alternative.

1.5 RELATED ENVIRONMENTAL DOCUMENTS

The following is a list of related NEPA, design and planning documents:

- Final Herbert Hoover Dike Major Rehabilitation Report and Environmental Impact Statement, November 2000.
- Draft and Final Herbert Hoover Dike Major Rehabilitation Evaluation Report, Reach One, Final Environmental Impact Statement, March 2005 and July 2005. The Record of Decision was signed in August 2005.
- Draft Herbert Hoover Dike Major Rehabilitation, Reaches 2 and 3, Environmental Impact Statement and Engineering Analysis, Palm Beach, Glades and Hendry Counties, Florida, December 2006.
- Draft and Final Herbert Hoover Dike Major Rehabilitation, Glades, Hendry, and Palm Beach Counties, Environmental Assessment and Finding of No Significant Impact, Modified Design in Reach 1 and Priority Toe Ditch Repairs in Reaches 1, 2, and 3, dated December 2006 and January 2007.

1.6 DECISION TO BE MADE

The previous EA, titled “Final Herbert Hoover Dike Major Rehabilitation, Glades, Hendry, and Palm Beach Counties, Environmental Assessment and Finding of No Significant Impact, Modified Design in Reach 1 and Priority Toe Ditch Repairs in Reaches 1, 2, and 3” was released in January 2007. This EA discussed the need to reinforce the dike expeditiously due to continued occurrences of seepage and piping. The USACE South Florida Operations Office (SFOO) identified areas of the dike that needed immediate repair (these areas were identified based on the frequency of emergency repairs); the EA then assessed the impacts of backfilling the toe ditch in those identified focus areas. Included was a discussion of the value of wetlands that would be impacted from backfilling the toe ditch in the focus areas and a description of the compensatory mitigation that has been completed. The EA also summarized the actions that led to a modification of the design for rehabilitation of Reach 1 and what the conceptual design entailed. Backfilling of the toe ditch is an expedient repair that substantially improves the condition of the dike in the focus areas and provides increased protection while the final design is being completed and constructed.

The purpose of this current EA is to evaluate impacts to the environment from the proposed partial seepage berm in Reach 1 and the proposed partially penetrating test cutoff wall in Reach 1A (see Section 2.0 for a detailed discussion on the preferred alternative). The previous toe ditch backfilling in the focus areas will be expanded on by the seepage berm and incorporated into this project.

1.7 SCOPING

Informal consultation is in progress. Interagency participation with USFWS, EPA, FDEP, and the Corps has been ongoing. These agencies participated in the wetlands analysis on March 13

2007. USFWS is satisfied with existing Coordination Act Report (CAR) and its determinations. A scoping power point presentation on the preferred alternative was sent out to interested agencies on 28 March 2007. SHPO coordination is final and complete. Concurrence is expected with Corps determination to endangered species of “May affect, not likely to adversely affect.”

1.8 PERMITS, LICENSES, AND ENTITLEMENTS

Refer also to Section 4.11 Compliance with Environmental Requirements.

The proposed HHD repairs are subject to Section 404 of the Clean Water Act and would require Water Quality Certification from the FDEP. The Section 402(b) National Pollutant Discharge Elimination System (NPDES) permit will be required for construction activities that disturb more than 5 acres of land. This permit will be acquired prior to the initiation of construction.

The Corps currently has the following water quality certificates (WQC) as of March 2007:

- In Reach 1A, the Corps has a De minimus exemption (serves as WQC) to construct the seepage cutoff wall (DEP File # 0234604-001). This exemption covered the original cutoff wall design and the toe ditch French drain repair. This de minimus may be used for the revised Reach 1A test cutoff wall project.
- In Reach 1D, the Corps has a De minimus exemption (serves as WQC) to construct the seepage cutoff wall. The Corps is in the process of reaffirming this exemption to ensure permit coverage for Fall 2007. (This reaffirmation process will begin once design details are available.)
- In Reach 1, the Corps has an Environmental Resource Permit (ERP) (serves as WQC) to construct emergency toe ditch backfilling repairs along 20,000 ft of high risk portions of Reach 1 (DEP File # 0234604-003), covered in previous EA.

The Corps is in the process of obtaining the following:

- The Corps has applied for a permit to construct 10,000 ft of seepage berm extension along the northern most portion of Reach 1A. This permit is expected to be issued by May 1, 2007 in time for Contract Bid opening.
- The Corps is seeking to reaffirm the Reach 1A Seepage Cutoff wall de minimus exemption to cover the new design scheduled for construction in Summer 2007.
- Additional permit coverage will be obtained for the remainder of the seepage cutoff wall and seepage berm repairs to Reach 1 once the designs are available.

The local Sponsor, South Florida Water Management District (SFWMD), has the responsibility for acquiring all lands and easements for project implementation.

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2.0 ALTERNATIVES

Alternative solutions (Alt No. 1 through Alt No. 3) were proposed in the 2000 HHD MRR, the recommended solution at that time was identified as Alt No. 3 based on engineering and socio-economic decisions. The 2000 MRR addressed consequences of a dike failure, which included population impacts and loss of life, as well as, economic and environmental damages. A probabilistic risk and uncertainty model was developed to complement the more traditional analysis methods and provide an additional decision-making tool.

In 2001 a Value Engineering (VE) study was initiated for the project in order to reduce real estate costs and minimize the footprint of the Preferred Alternative No. 3 within functional wetlands. In 2002 through 2003, emergency repairs to the HHD were undertaken to stop boils occurring in the toe ditch in Reach 1 near South Bay. Unfortunately, the VE recommended plan was unsuccessful due to additional seepage appearing in the toe ditch. In addition, seepage water was being introduced onto adjacent private properties. This led the Corps to modify the selected alternative described in the 2000 MRR and 2001 VE and prepare a Draft Supplemental EIS (DSEIS) to evaluate a new design for Reach 1, resulting in the development of Alternative No. 4.

In September of 2006, an ITR was implemented in response to the need to revisit the design for rehabilitation of HHD, in order to capture lessons learned from the post-Katrina evaluations of the New Orleans and Southeast Louisiana Hurricane System. The ITR reviewed project activities for compliance with current Corps of Engineers guidance, lessons learned, and conclusions and recommendations contained in the “Performance and Evaluation of the New Orleans and Southwest Louisiana Hurricane Protection System IPET Report” and the non-Federal sponsor “Report of Expert Review Panel, Technical Evaluation of HHD Lake Okeechobee, Florida”.

The ITR team considered the evolution of the project design, from the Major Rehabilitation Report (MRR) completed in November 2000 through the Plans and Specifications (P&S) phase to determine if changes were warranted to the final design. The goal was to have an independent review of the assumptions, analysis, and design with the intent to validate the conclusions reflected in the final design or recommend adjustments to protect the public interest. The ITR results and recommendations led to the design contained in the Preferred Alternative No. 5. Alternative No. 4 did not provide the redundancy, resiliency and robustness that the ITR determined necessary to meet the project reliability and therefore was eliminated.

2.1 DESCRIPTION OF THE ALTERNATIVES, INCLUDING NO ACTION AND PROPOSED ACTION

2.1.1 No Action Alternative

The No Action Alternative is defined as not taking actions or making physical alterations to improve or repair the HHD within Reach 1. It would maintain the current condition of the dike (**Figure 2-1**). The No Action Alternative would not provide acceptable level of risk with current regulation requirements of safety factors relative to dike stability. Without acceptable improvements to the HHD, the safety of the surrounding human and natural environment may be severely impacted with subsequent effects upon the local and regional economies. The

continuation of seepage, piping and boils occurring in this area will increase the risk of a failure of the dike. In the event of a total breach, significant impacts to human life (including human suffering and loss of life), and substantial impacts existing soils, vegetation, water resources, habitat, threatened and endangered species, agriculture and property would result. The No Action Alternative does not provide a long-term solution to the seepage and stability problems existing along Reach 1.

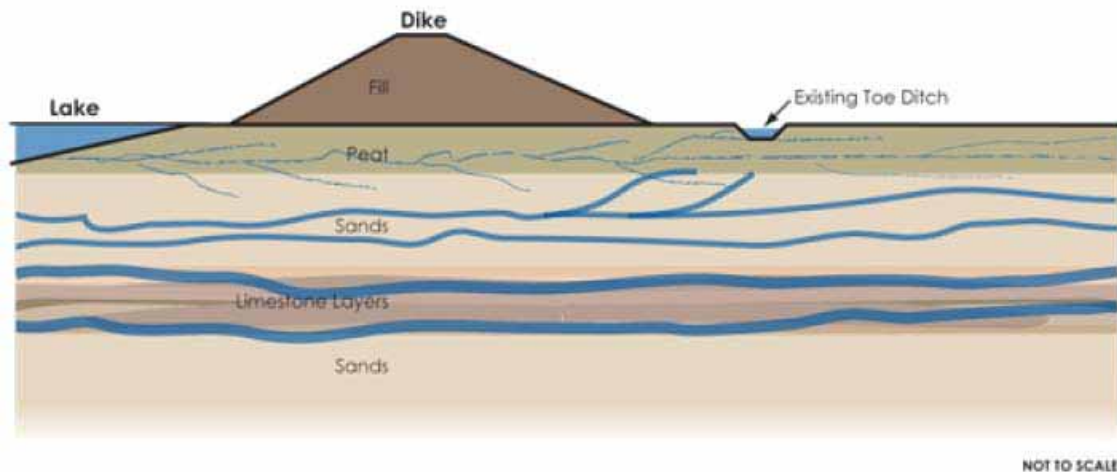


FIGURE 2-1: NO ACTION ALTERNATIVE (EXISTING CONDITIONS)

2.1.2 Alternative No. 5 (Preferred Alternative)

A key lesson learned from the failures of the New Orleans levees following the impact of Hurricane Katrina, and emphasized by the Corps' independent review team (IPET 2006), is the need to provide designs which include resiliency, redundancy and robustness. The recommended plan for rehabilitation of Herbert Hoover Dike (HHD) consists of an integrated solution that addresses internal erosion, slope stability and foundation vulnerabilities. This integrated solution includes two main features: a seepage berm and a partially-penetrating cutoff wall (see **Figure 2-2**). These features will work in unison to address the problems identified above.

2.1.2.1 Seepage Berm

The primary purposes of the seepage berm are to control internal erosion due to through-seepage and underseepage and add necessary slope stability that is needed to withstand forces due to the design pools. If left unchecked, seepage flows through the highly pervious foundation could lead to a failure of HHD by internal erosion, mainly through "piping". Piping is a progressively deteriorating process initiated by erosion at the toe followed by continuing erosion backwards from the landside to the lakeside, resulting in an underground, open conduit between the lake and landside toe which can lead rapidly to failure or breach of the embankment. This form of seepage control is the most accepted practice in the geotechnical community of practice to address this type of problem and has been endorsed for use in HHD by many experts that have reviewed this project and proposed solutions throughout the past ten years, including the Supplemental ITR Team convened in the summer 2006.

The full seepage berm will extend from the landside toe of the embankment out to varying distances ranging from about 25-feet minimum to about 175-feet maximum. The width of the seepage berm beyond the ROW has not been finalized yet. When a full project footprint is available it will be coordinated with stakeholders and affected parties. Prior to constructing the remainder of the project the Corps must have modeling and other technical information. Any work outside the existing ROW will be addressed in future NEPA documentation. The seepage berm thickness will be about 6-8 feet and it will be constructed with predominantly sands and gravels, except that it will include transition layers at the contact with the existing embankment to satisfy filter design criteria. A drainage swale would also be constructed along the landward toe of the berm to collect and convey surface drainage from each side of the seepage berm. Where a toe ditch is present, it will be filled and covered by construction of the seepage berm. Where a C&SF drainage canal exists, its functionality will not be negatively impacted. The seepage berm is relatively easy to construct, and it can be implemented immediately in the most critical areas of the dike where adequate space is available.

Rehabilitation of the Herbert Hoover Dike can be expedited and an increase in the level of protection provided by construction of a portion of the seepage berm in Reach 1 within the Corps existing ROW (Phase 1). This EA is evaluating the environmental effects of Phase 1, including the impacts of backfilling the wetlands landward of the dike within the Corps existing ROW. When the design of the full seepage berm is completed in conjunction with the cutoff wall for subreaches 1B through 1D, a future NEPA document will be produced to assess these effects. See **Figure 2-3** for typical cross sections of the partial seepage berm to be constructed as discussed in this EA. **Figure 2-4** is a typical cross section of the full seepage berm. In areas where a partial berm already exists, the full berm will be constructed by extending the partial berm.

2.1.2.2 Partially Penetrating Test Cutoff-Wall

One primary purpose of the partially-penetrating cutoff wall is to block off any pre-existing piping pathways within the embankment and the embankment foundation that may have developed throughout the long history of seepage and internal erosion and “piping”. In addition the cutoff wall will account for pre-existing foundation defects under the embankment that were not addressed during the construction of the embankment. These foundation defects were not treated in the original construction of the dike due to the incremental way in which it was built and probably due to a lack of a full understanding of the future consequences at that time. A secondary purpose of this feature is to assist in the reduction of hydraulic exit gradients at the toe of the embankment to ensure that seepage will not lead to internal erosion.

A partially penetrating test cutoff wall will be implemented in Subreach 1A to analyze any potential influence on regional groundwater. The impervious, partially-penetrating cutoff wall will extend from below the centerline of the embankment to 5-10ft below the limestone layers. The limestone exists at varying depths along the HHD alignment and is highly transmissive and is one of the main reasons for the seepage flows at the toe of the embankment.

2.1.2.3 Integration of Seepage Berm and Cutoff Wall for Complete Solution

Analyses have shown that, neither of these features (seepage berm or cutoff wall) on their own will provide the appropriate level of reliability. The primary purposes of the seepage berm are to control internal erosion due to through-seepage and underseepage and add necessary slope stability needed to withstand forces due to the design pools. The primary purpose of the partially-penetrating cutoff wall is to block off any pre-existing piping pathways within the embankment and the embankment foundation that may have developed throughout the long history of seepage and internal erosion and “piping”. The solution will combine these features in such a way as to try and address concerns such as real estate impacts and the existence of other features, such as highways and railroad lines, which may prevent the full implementation of the seepage berm. In these cases, the Jacksonville District will work with its senior leadership and the South Florida Water Management District to develop solutions consistent with the project needs while attempting to consider concerns of all parties. In summary, the approach being applied for the rehabilitation of Herbert Hoover Dike includes the multiple lines of defense to ensure that the project will provide its authorized level of protection for the safety of the public for lake levels corresponding to the Standard Project Flood (SPF) lake level, which is 26.4 ft (NGVD 29).

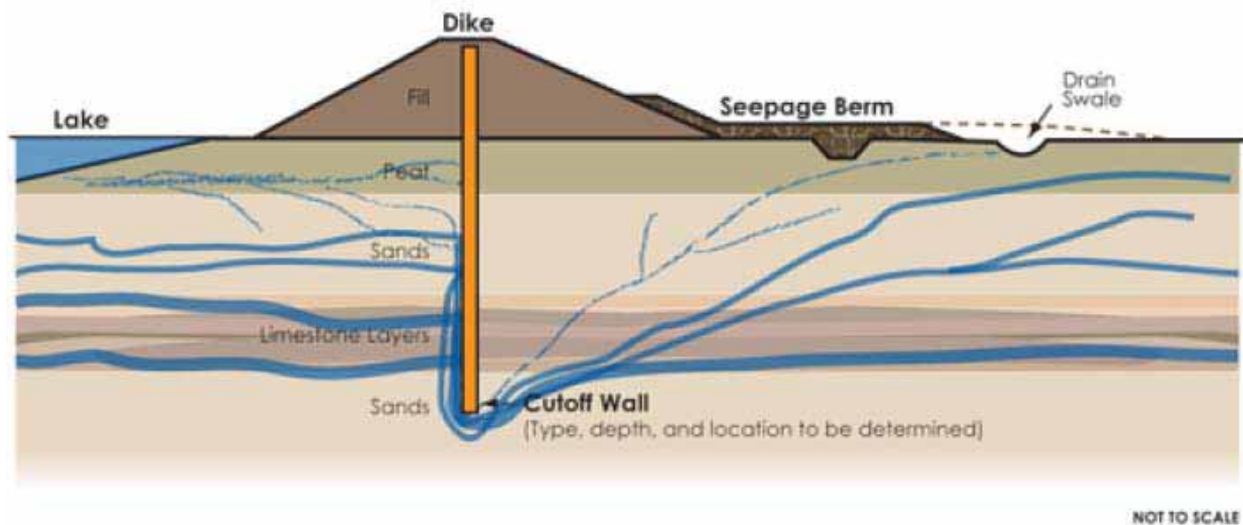


FIGURE 2-2: ALTERNATIVE NO.5 (PREFERRED ALTERNATIVE)

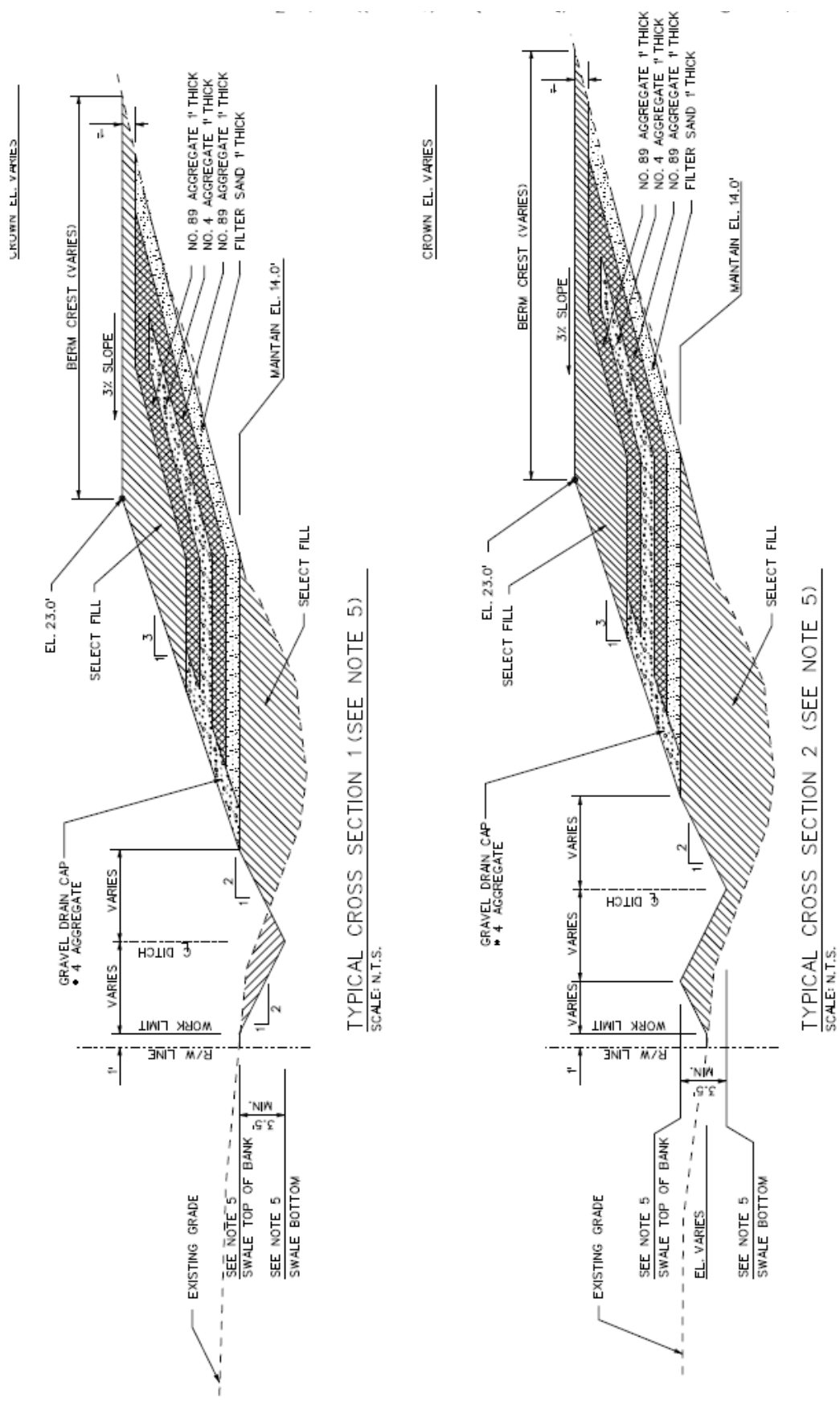


FIGURE 2-3: TYPICAL CROSS SECTIONS OF THE PARTIAL SEEPAGE BERM

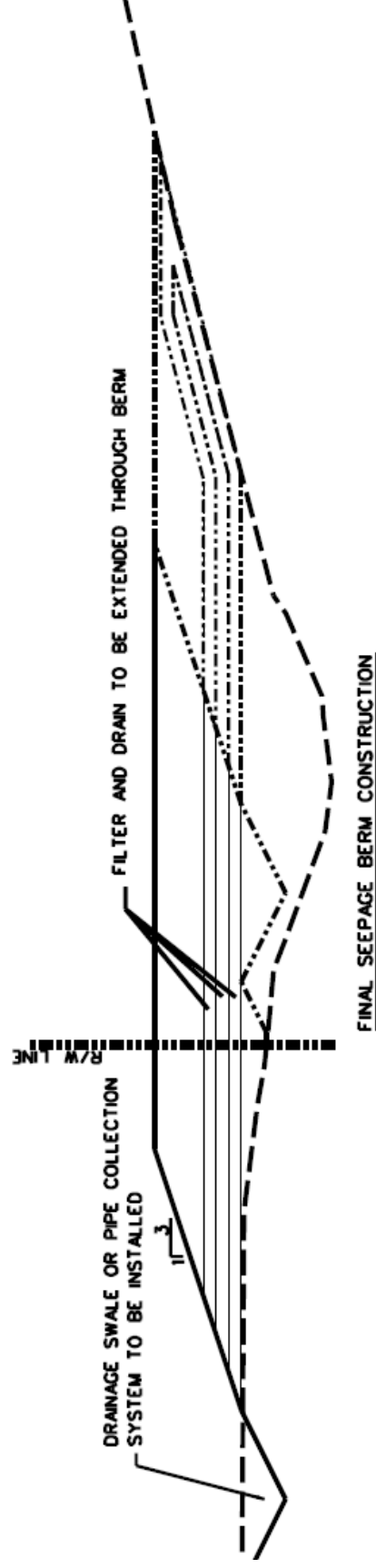


FIGURE 2-4: TYPICAL CROSS SECTION OF THE FULL SEEPAGE BERM

2.2 DESCRIPTION OF ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

2.2.1 Alternative No. 1

This alternative includes increasing the water level in the drainage ditches and the construction of a stability berm at the landside toe of the levee (**Figure 2-5**). Alternative No. 1 would improve the existing drainage ditches by cleaning out the ditches and re-grading the ditches. Culverts with automatic/manual gates and pumps would be installed to control the water level in the ditches. During critical high water periods, the water level in the ditches would be raised in order to limit the differential head across the levee. Raising the water levels in the ditches would increase the local flooding potential due to rainfall and runoff. Presently, local drainage districts and farmers control most of these ditches.

This alternative does not provide adequate level of protection from the seepage and stability problems that threaten critical areas of Reach 1 of HHD. In addition, this alternative increases local flooding potential in areas immediately adjacent to the dike; therefore, this alternative was eliminated from the alternatives.

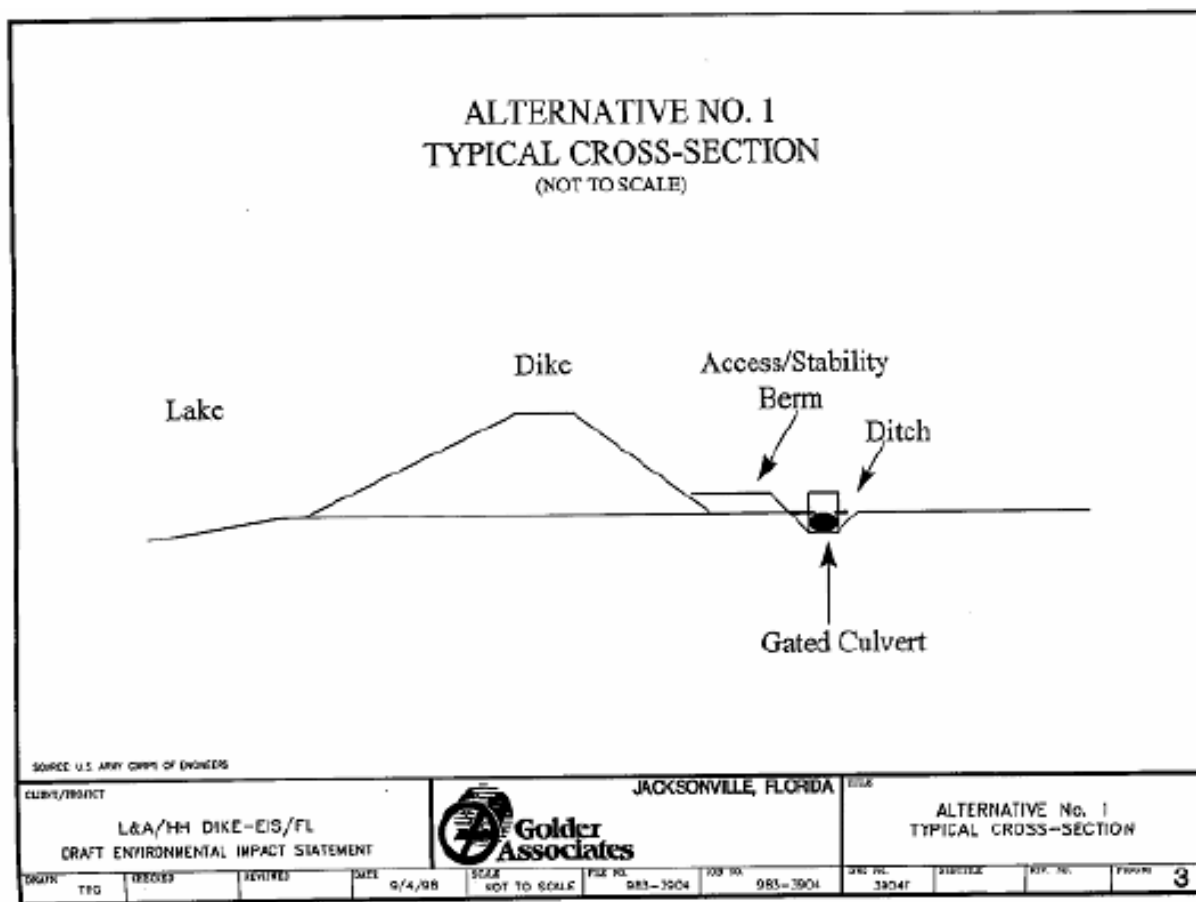


FIGURE 2-5: ALTERNATIVE NO. 1

2.2.2 Alternative No. 2

Alternative No. 2 involves an upstream (lakeside) impervious cutoff wall and a landside stability berm at the toe of the levee (**Figure 2-6**). This is the most positive method of underseepage control because it reduces both uplift pressure and through seepage. The wall would consist of a 3 ft (0.9 m) wide, 60 ft (18 m) deep excavation filled with soil-bentonite or soil-cement mixture. The top of the wall would be at an approximate elevation of 25 ft (7.6 m). A landside stability berm as described in Alternative No. 1 would also be constructed. Due, in part, to the lakeside location of cutoff wall leaving the wall susceptible to overtopping during extreme events and erosion during wave attack, this alternative was not selected as the preferred alternative at the time the FEIS was produced in 2005. Further, the landside toe treatment in this alternative would not provide the desired level of protection.

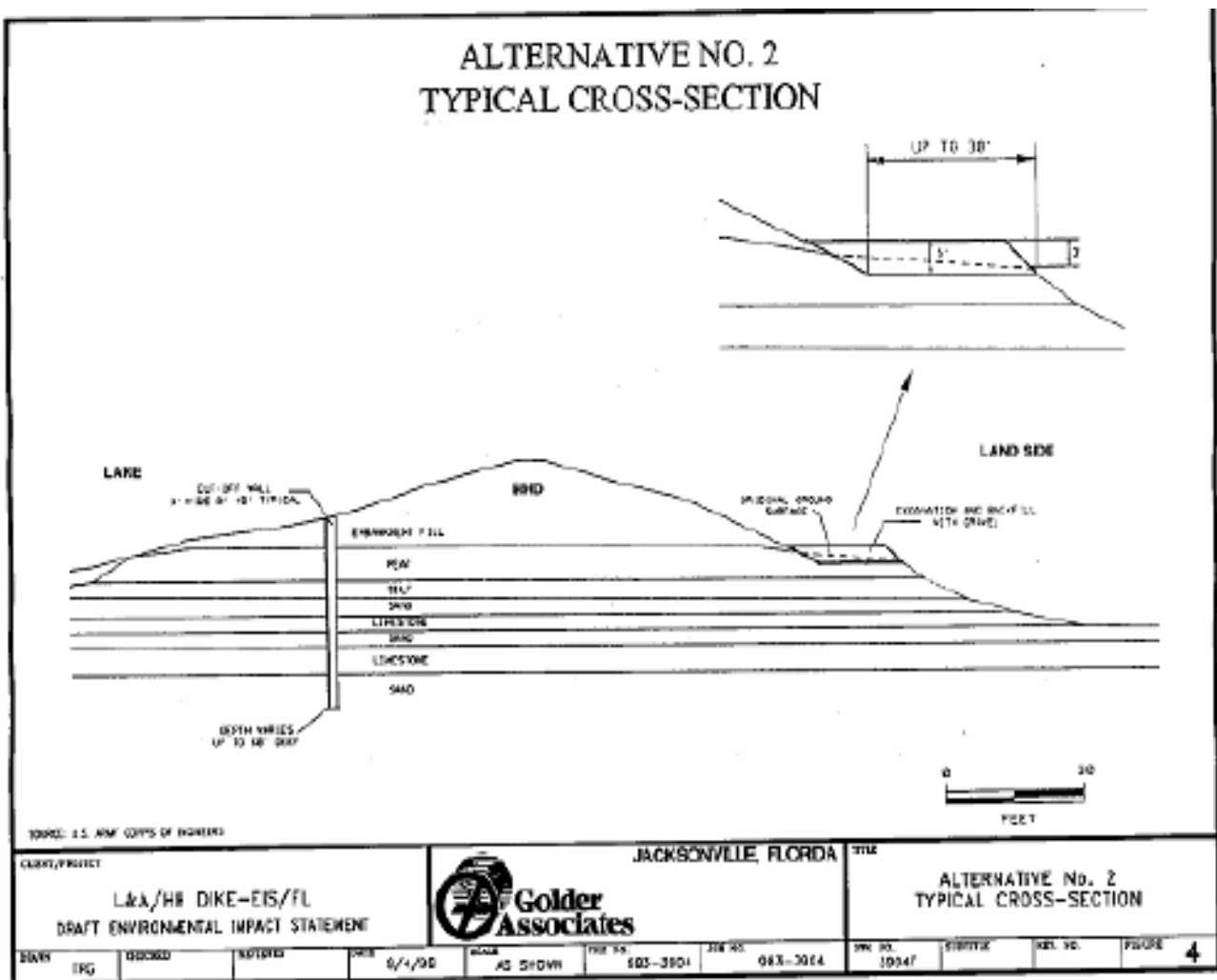


FIGURE 2-6: ALTERNATIVE NO. 2

2.2.3 Alternative No. 3

Alternative No. 3 consists of the installation of a seepage berm with a relief trench and a french drain system along the landward toe of the HHD (**Figure 2-7**). In areas where the HHD toe rests on a peat layer, construction of the seepage berm would begin with excavation of peat material from the landside toe. No excavation would be performed at higher elevations of the embankment slope. The seepage berm would be constructed along the lower portion of the embankment toe. The landward side of the berm would contain perforated culvert. A deep relief trench would be excavated immediately below the culvert within the toe ditch and along its entire length. The berm would prevent the piping of sands and silts from the embankment and its foundation. The relief trench was designed to control uplift pressures and prevent seepage and piping flows from extending landward of the embankment. The perforated culvert system should collect and convey seepage flows to controlled outlets that empty into existing drainage canals. A drainage swale would also be constructed along the landward toe of the berm to collect and convey surface drainage from each side of the drainage berm. In emergency implementation of this alternative on a one-mile stretch of Reach 1, the design demonstrated lack of ability to control seepage that would resurface on adjacent properties. In addition, this alternative would require additional real estate acquirement, and have wetlands impacts and effects to fish and wildlife resources. Therefore, this alternative was not selected in 2005.

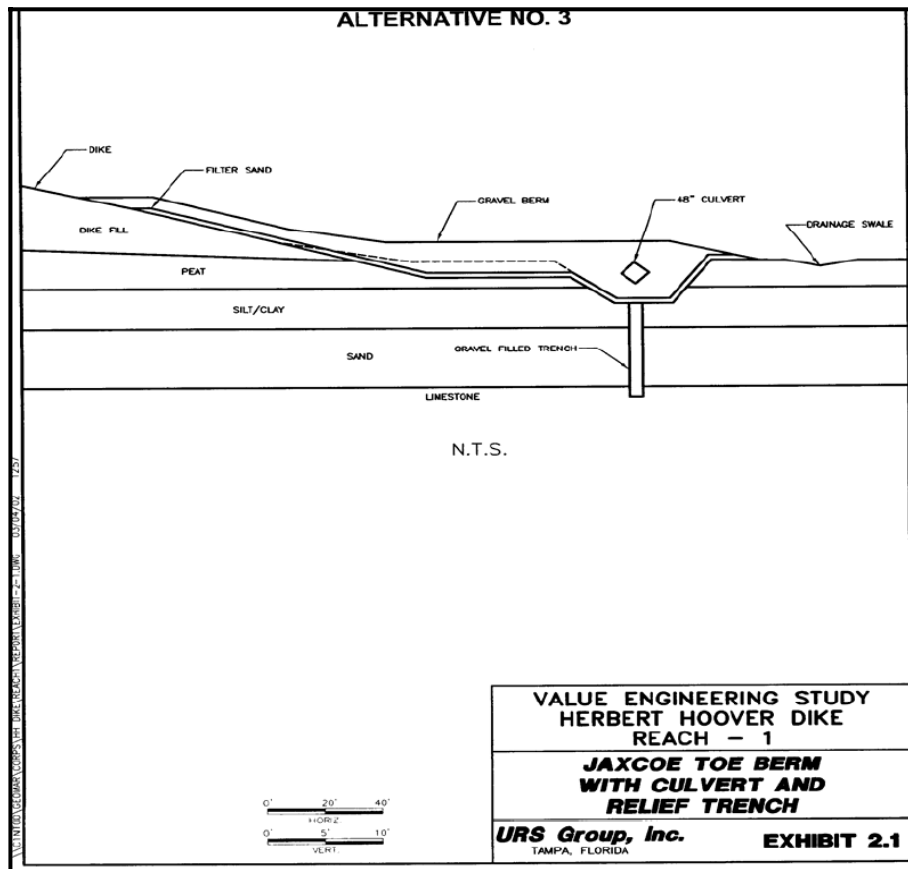


FIGURE 2-7: ALTERNATIVE NO. 3

2.2.4 Alternative No. 4

Alternative No. 4 was the preferred alternative in the FEIS, dated July 2005. The design included a hanging seepage cutoff wall on the landward side of the dike slope and a relief trench with an inverted filter and relief berm at the toe of the landward slope of the dike, stopping at the HHD's toe ditch. The relief trench and inverted filter would be constructed adjacent to the existing toe ditch and within the HHD footprint at the landward toe. An access road would be built on top of the relief trench. The plan is similar to Alternative No. 3 (MRR preferred alt), but would not contain a closed conduit (perforated culvert), instead using the existing open toe ditch for removal of seepage and utilizes the hanging cut-off wall to prevent piping. The closed conduit would be replaced with the existing open toe ditch for removal of seepage. Seepage water from the seepage toe berm and relief trench would flow freely into the existing toe ditch. The toe ditch geometry may have to be altered on the lakeward side of the ditch due to construction of the trench and drain system. The final design would insure no negative impact on flood control.

The initial decision in 2005 to select this alternative was based on the belief that the selected plan provided adequate margins of safety and protection from dike failure. Recent reviews of dike safety, both external and internal to the Corps, coupled with experiences and lessons learned in the aftermath of Hurricane Katrina, have emphasized the need to design an alternative that provides resiliency, redundancy and robustness. This alternative does not provide resiliency, redundancy and robustness and therefore does not provide the appropriate level of reliability deemed necessary by the Corps.

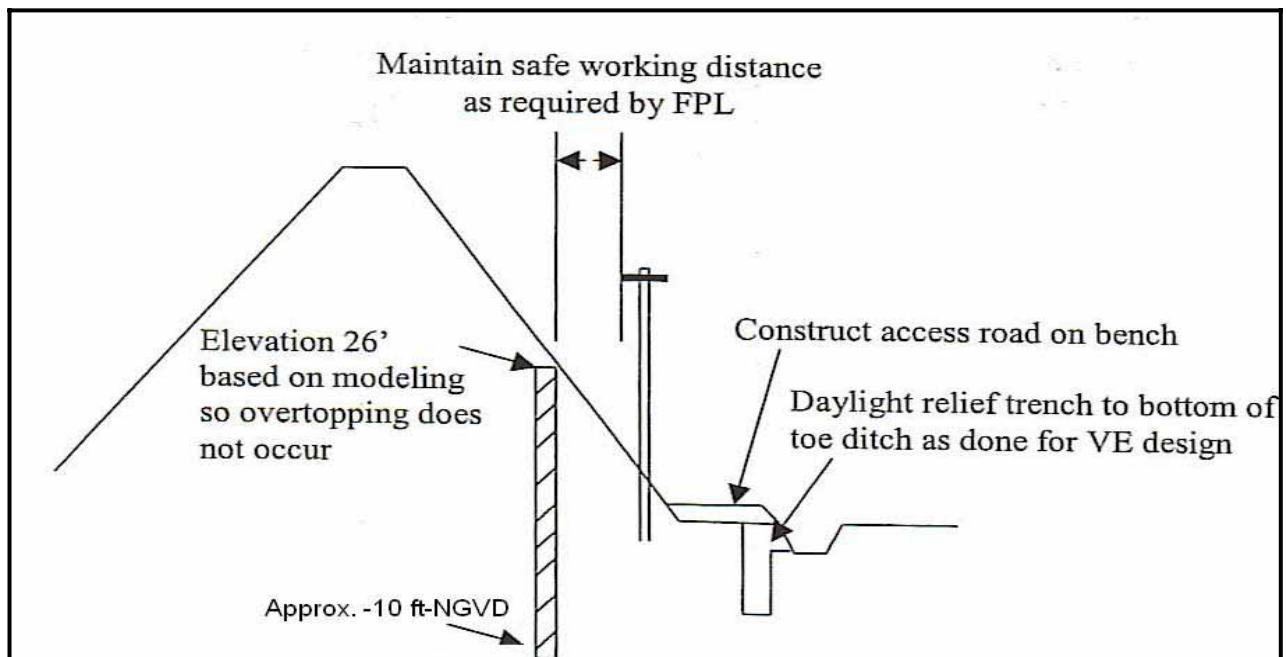


FIGURE 2-8: ALTERNATIVE NO. 4

2.3 COMPARISON OF ALTERNATIVES

Table 4-1 lists the alternatives under consideration and summarizes the major features and consequences of each of them. See Section 4.0 Environmental Consequences for a discussion on alternative impacts.

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3.0 AFFECTED ENVIRONMENT

The following affected environment discussion includes the following for Reach 1: wetlands, protected species, water resources, socio-economics, cultural resources, recreation, HTRW, aesthetics, noise and air quality. It is anticipated that impacts from the project will be isolated to these environmental resources. This Section does not present effects, but puts forth the baseline environment for comparisons in Section 4.0 - Environmental Consequences. For a more comprehensive, detailed discussion on the existing Reach 1 environment, reference Section 3.0 of the “Herbert Hoover Dike Major Rehabilitation Evaluation Report, Final Environmental Impact Statement”, dated July 2005.

3.1 WETLANDS IN REACH 1

The toe ditch along side the Herbert Hoover Dike was a result of constructing the dike itself. Fill was excavated along Lake Okeechobee to construct the HHD; as a result the toe ditch was created. Over the years rainwater and seepage from the Lake have collected in the toe ditch establishing a wetland habitat for fish and wildlife. The toe ditch wetlands vary in width along Reach 1 from approximately 30 ft at the north end of Reach 1A to approximately 2-4 ft at the south end of Reach 1D. Typically the shallower, narrow portions of the toe ditch do not hold standing water during the dry season. The landscape east of the toe ditch (TD) varies considerably along the 22.5 miles of Reach 1, consisting of wetlands, roads, railroads, private property, and junk yards adjacent to the TD. Typical vegetation observed in the toe ditch wetlands or wetlands beyond the TD include Brazilian pepper, cattails, cabbage palm, common reed, cypress, elderberry, hackberry, pennywort, primrose willow, royal palms, strangler fig, southern willow, water lettuce, and water hyacinth. Although wetlands present on the landward side of Reach 1 may not be considered high quality ecosystems, they host small fishes and invertebrates and provide usable foraging habitat for wading birds, alligators, and turtles.

3.2 THREATENED AND ENDANGERED SPECIES

There is no critical habitat for listed endangered species along the outer toe of HHD. Protected species that might be observed in the region include wood stork (E=endangered), snail kite (E; critical habitat inside HHD in Lake Okeechobee littoral zone), eastern indigo snake (T=threatened), and the bald eagle (T).

3.3 STATE LISTED SPECIES

The burrowing owl and tree snails are species of special concern in Florida, which may be present in the project vicinity.

3.4 WATER RESOURCES

Lake Okeechobee receives water principally from rainfall and from the Kissimmee River, which enters the lake from Okeechobee County to the north. Major outfall canals along Reach 1 include the St. Lucie, West Palm Beach, and Hillsboro Canals (see **Figure 3-1**). The groundwater throughout the Lake Okeechobee area is usually within 3.28 ft (1 m) of the land surface. This water table generally parallels the land-surface features. Differences in ground

elevations are so slight that the water table is a relatively uniform surface with few undulations. The principal source of recharge to the groundwater in this area is derived from local rainfall and by subsurface percolation from the canals into the permeable materials. Discharge from this shallow groundwater reservoir is by evaporation from the land or water surfaces, transpiration by plants, seepage into canals, and pumping from shallow wells. The groundwater flow typically follows a north to south gradient.

The major artesian aquifer underlying this region is the Floridan Aquifer, which occurs from about 1000 ft (300 m) bls to bedrock (Schroeder et al, 1954).

Along Reach 1, there are eight gated culverts, two hurricane gate structures, and one lock. Control of waters from these structures is primarily the responsibility of the Corps and SFWMD. However, eight private drainage districts assume control of water flow within the region of Reach 1. These are: 1) Mayaca Groves, 2) Palm Beach Groves, 3) Cloister Farms, 4) U.S. Sugar Corporation, 5) East Beach Drainage District, 6) Pahokee (or 715) Farms, 7) East Shore Drainage District, and 8) South Shore Drainage District.

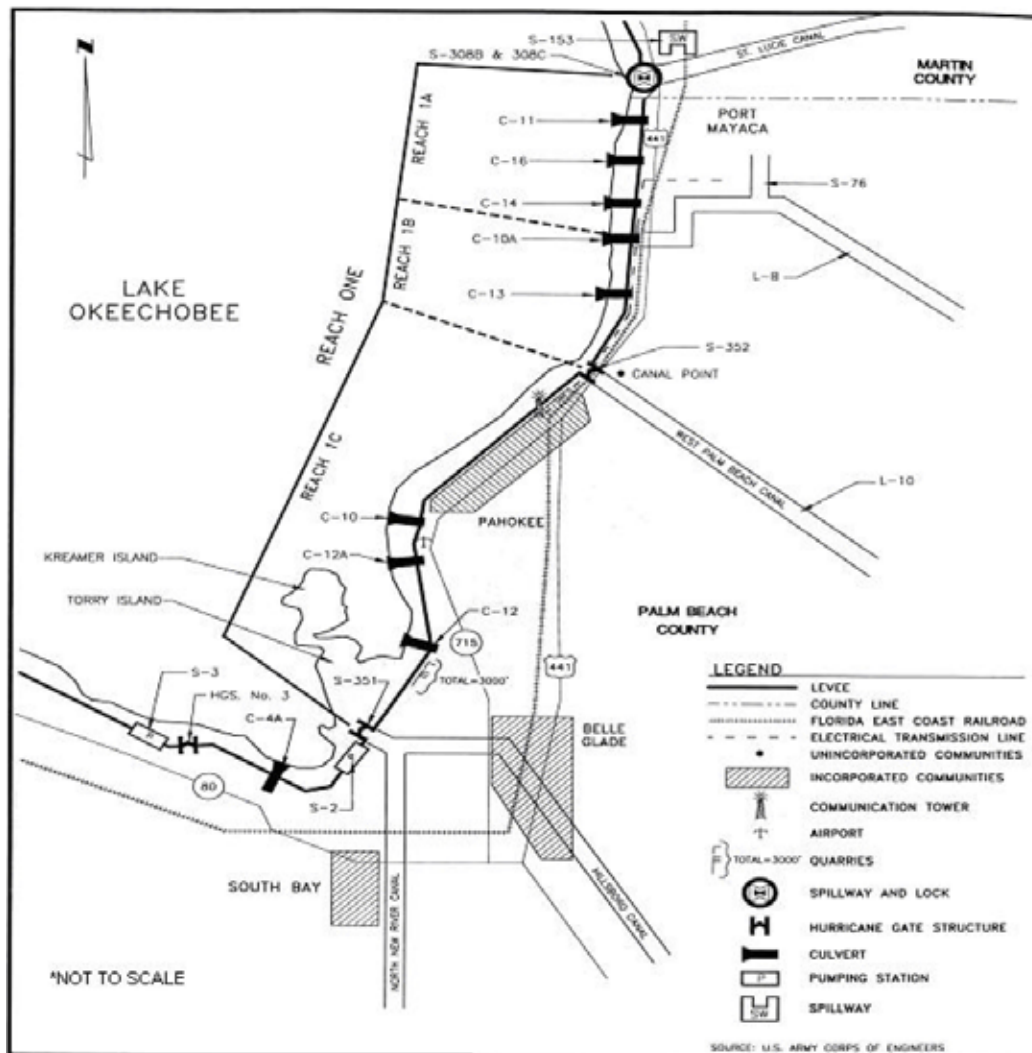


FIGURE 3-1: CANALS AND STRUCTURES AT REACH 1

3.5 SOCIO-ECONOMICS

Agriculture, recreation and tourism all play an important role in socio-economics, which is the relationship between economic activity and social life.

Agriculture in this region is dependent upon the Lake as a source of irrigation water. The regulated lake depths make it possible for farmlands to receive irrigation water year round regardless of rainfall. In the Lake Okeechobee service area, there are an estimated 742,668 acres of irrigated agricultural lands. These agricultural lands and associated activities employ hundreds of people in the area and bring millions of dollars in revenue annually. Agriculture in the vicinity of Reach 1 is dominated by sugarcane, accounting for 90% of land under cultivation. The remaining 10% of cultivated land primarily includes rice, row crops, and sod (David Miller & Associates, 1998). During prolonged droughts, significant volumes of water from the lake are required to supplement local water supplies and to prevent saltwater intrusion into coastal aquifers and wellfields.

Recreation and tourism activities in the area are located primarily in and around Lake Okeechobee. Lake Okeechobee is the largest recreational resource in the region. The Lake has been an historic tourist destination, and the Lake and its associated waterways and shoreline provide a wide variety of water-based recreation activities for local residents and out-of-state visitors, including: fishing, boating, picnicking, sightseeing, camping, swimming, birding, hunting, air boating and hiking.

Birding – heavy waterfowl utilization of Lake Okeechobee attracts tourists and recreational enthusiasts. Common waterfowl species include ring-necked duck (*Aythya collaris*), American widgeon (*Anas Americana*), northern pintail (*A. acuta*), green-winged teal (*A. Crecca*), Florida duck (*A. fulvigula*), and lesser scaup (*Aythya affinis*).

Fishing – Lake Okeechobee supports a variety and abundance of sport fish. Consequently, sport fishing is a major recreation activity on the lake. Lake Okeechobee is currently recognized as supporting one of the best recreational fisheries in the nation. Additionally, it supports an active commercial fishing industry. This includes several different types of commercial fishing operations and landside support activities, such as marinas and wholesale and retail distribution facilities. The annual value of the wholesale commercial fishing is \$2,326,932 and employs 210 people (David Miller & Associates, 1998).

In 1996 the annual value of the recreational resources of the lake was estimated at \$78,151,409 (David Miller and Associates, 1998).

There are commercial fisheries on Lake Okeechobee that harvest the American alligator and the Florida soft shell turtle. Alligators are harvested from the lake population to supplement the stock in alligator farming operations. Soft shell turtles are harvested by commercial fishermen, with some individual yields in excess of 30, 000 pounds (13,640 kilograms) annually. The majority of the harvest is prepared for shipment to Japan, or sold locally, primarily to the Miccosukee Tribe (Moler & Berish, 1995).

The depth of Lake Okeechobee makes commercial navigation on the lake possible. Commercial navigation of Lake Okeechobee and associated waterways was used to transport 430,000 tons of freight in 1995. Petroleum products, including distillate fuel oil, residual fuel oil, and liquid natural gas, comprise the majority of tonnage shipped. Other commercial navigation includes fleets of day/dinner cruise vessels that operate during the tourist season from Pahokee.

3.5.1 Demographics

Reach 1 mainly falls within Palm Beach County; however a small portion of northern Reach 1 falls in Martin County (see Figure 1-1). The towns within these counties that are adjacent to the Dike include Pahokee and Belle Glade. According to data derived from the 2000 U.S. Census Bureau, the total population of these two towns is 20,891 residents. As shown in Table 3-1 nearly a third of the population is white and more than half of the population is black. The remainder of the population is American Indian, Asian, Native Hawaiian or Pacific Islander, or another race.

TABLE 3-1: PROJECT AREA POPULATION: ETHNICITY

Project Areas	Total Population	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian or Other Pacific Islander	Other Race
Belle Glade	14906	30.30%	50.70%	0.20%	0.20%	0%	8.90%
Pahokee	5985	25.20%	56.10%	0.10%	0.50%	0%	15.20%

To capture available median income, poverty statistics about the area's population Census Tract data for Martin and Palm Beach counties was used. As Table 3-2 shows, the average median family income for the project area is approximately \$26,500. Approximately one-third of the population throughout the study area has an income below the 1999 poverty level. The median household income for the state of Florida is \$38,985, with the median household income of the United States at \$43,318.

TABLE 3-2: PROJECT AREA POPULATION: INCOME AND POVERTY STATISTICS

Project Areas	Population	Median Household Income in 1999 Dollars	Individuals below Poverty Level	Percentage of Population with Income in 1999 below Poverty Levels
Belle Glade	14,906	\$22,715	4,919	33%
Pahokee	5,985	\$26,732	1,802	30%

3.6 CULTURAL RESOURCES

The State Historic Preservation Officer (SHPO) has listed HHD as eligible for inclusion on the National Register of Historic Places for its historic significance.

3.7 RECREATION

A variety of recreation resources are enjoyed year-round on Lake Okeechobee. State Road 717 (near S-351) provides access to Torry Island adjacent to Belle Glade Municipal Golf Course. An existing bike path is located on the north lane of SR 717 that terminates at the base of the dike (FDOT, 1998). The Belle Glade Recreation Area on Torry Island includes a multi-laned boat ramp, marina and campground. The J-Mark Fish Camp and Slim's Fish Camp are also located on Torry Island (Greater Lake Okeechobee Tourist Alliance, 1997). Kreamer Island is just north of Torry Island and is renowned for its fishing, bird watching and hunting. It is accessible by boat only, except during extremely low lake levels. In Canal Point, the Canal Point Lion's Club Park is used for recreation. At this park and up and down the Palm Beach Canal (a ¼ mile each way) the area is utilized year round by fishermen and boaters. The rustic recreation facilities in this project area are utilized throughout the year and are important to residents, budget minded tourists, and the local economy.

The U.S. Department of Agriculture, Forest Service, produced the Florida National Scenic Trail Comprehensive Plan, 1986, which proposed a multi-use trail for the top of HHD by authority of the 1968 National Trails System Act (P.L. 90-543, 82 Stat. 9119). Designated as part of the Florida National Scenic Trail in 1993, the Lake Okeechobee Scenic Trail (LOST) is an approximate 110 mile trail encircling Lake Okeechobee. Most of the trail consists of crushed gravel on top of the Herbert Hoover Dike. The LOST is open year round for a variety of uses including hiking, bicycling, bird watching, fishing, and photography. Hunting is not permitted on any section of the trail. The economic effects of recreation activities that occur in the Lake Okeechobee region, because of the lake, have been estimated to be approximately \$78M in 1996 figures (GLOTA, 1998).

3.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

Several site visits were conducted with the most recent HTRW survey conducted on August 12, 1998. The HTRW database, aerial photography review and site assessment of the existing conditions found the potential of HTRW contamination within the region of the project site. The Herbert Hoover Dike was free of discolored soil, stressed vegetation, and other factors that may indicate contamination that would require clean-up on the dike. However, several locations adjacent to the dike have the potential of being a source contamination. In the municipality of Pahokee, businesses and private residences have installed a property fence creating a secure backyard boundary, the dike. This may have caused residents in the neighborhood to store materials close to the dike. Although no obvious contamination was observed, the potential of having past spills in these areas does exist. The physical inspection was performed by random spot check and driving along the road in the vicinity of the dike. It should be noted that rainfall and the high seepage rates in the area would have flushed-out most hydrocarbon, or smaller molecule chemical spills. Large molecule (ex. Polychlorinated Biphenyls (PCB's) and metals may be less mobile and these spills may still measure residual levels. During real estate

procurement and project construction, further evaluations would be required. The perimeter road has several leaking underground storage tanks and there have been several reported spills around Lake Okeechobee. All of these potential contamination problems are located within towns or along highways that are near the dike.

3.9 AESTHETICS

There are seven public access points to view Lake Okeechobee from the elevated vantage point of the levee crown in Reach 1 as follows:

1. Port Mayaca
2. Canal Point Lions Club
3. East Beach Road
4. Pahokee Marina
5. Jones Pump House
6. Rardin Park
7. Belle Glade Marina

The designated Florida National Scenic Trail (FNST) runs atop the HHD around the entire lake, totaling approximately 115 miles (FDOT, 1998). Panoramic lake and surrounding landscape view sheds vary depending on view access and obstruction in the area. The sounds of an occasional boater, airplane, ATV or farm implement can tend to break the otherwise peaceful setting. The levee crown affords panoramic views of the flat agricultural fields to the east and rim canal and Torry Island to the west. Foreground views are dotted with minor visual impediments such as guardrail, power lines, trees, and small structures. Moderate aesthetic values are experienced in this area from atop the levee crown dependent on the time of year and day.

3.10 NOISE

Along Reach 1 there are a number of existing sources currently contributing to the overall ambient noise level. The more predominant of these sources include: vehicular traffic traveling along nearby highways; railroad traffic along the Florida East Coast Railway; single engine aircraft utilizing the Pahokee Airport; small industry (i.e., produce processing and distribution); boat traffic along the rim canal; urban activities in Pahokee and Belle Glade; agricultural equipment (tractors, trucks, etc.); and pumping stations. Rural areas typically have noise levels of 35-55 db. Sound levels along transportation arteries are typically in the range of 70 dB.

3.11 AIR QUALITY

Existing air quality in the affected environment is good to moderate. Over 90 percent of the project area is in Palm Beach County with only a small portion located in Martin County. This project is in an area which has been designated by the Clean Air Act as a Prevention of Significant Deterioration (PSD) Class II area for U.S. Environmental Protection Agency (EPA) regulated air pollutants except ground level ozone. All of Palm Beach County is classified by the FDEP as an Ozone Attainment/Maintenance Area. This project would not be subject to any

PSD incremental requirements for these pollutants since the project would fall under the fugitive emissions exemption, as per Rule FAC 62-212.400(a)(b).

In the area of Reach 1, there are a number of existing sources that may affect air quality in the project area. Registered stationary emission sources include thirty stationary air point sources located in Martin County, and close to two hundred stationary air sources in Palm Beach County (FDEP, 1998). Notable registered sources near Reach 1 include the local sugar processing plants. Namely, the Atlantic Sugar Association plant near Belle Glade, and the U.S. Sugar Corporation plant near Clewiston each contribute to the overall air quality of this area. In the area of Reach 1, the prevailing southeast and east-northeast winds may carry vehicle emissions from US 98/441, State Road 715, and the Florida East Coast Railroad. Although these mobile source emissions are not significant, they do currently contribute to the air quality in the area.

Additionally, short-term occurrences of elevated levels of airborne particulate matter may occur periodically from natural fires, controlled burns, and other sources. The potentially unaccounted for volatile organic compound emissions coming from nearby agricultural activities may contribute to the existing air quality as well.

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4.0 ENVIRONMENTAL CONSEQUENCES

This section discusses potential impacts to the existing environment, including direct, indirect, and cumulative effects that may result from implementation of the proposed Preferred Alternative compared to the No Action alternative and Alternatives 1 through 4. This chapter is organized by resource topics, with the impacts of the alternatives combined under each resource. Assessment of the No Action Alternative includes an increased probability of unsatisfactory performance of the dike system, or possible dike failure. Assessment of the Alternative No. 5 includes impacts associated with construction and utilization of Alt No. 5 on the existing environment. A summary of environmental consequences is displayed in **Table 4-1**. Also, included are the environmental consequences of the previously considered alternatives in **Table 4-2**.

4.1 ENVIRONMENTAL CONSEQUENCES OF NO ACTION ALTERNATIVE AND THE PREFERRED ALTERNATIVE

4.1.1 Wetlands in Reach 1

No Action Alternative

Selection of the No Action Alternative would lead to minimal wetland impacts if there should be a failure of the HHD system. These impacts would result from increased water levels due to flooding landward of the HHD.

Alternative No.5

Wetland impacts resulting from implementation of Alternative No. 5 would be considerable. This alternative involves construction of a test cutoff wall in Reach 1A and partial seepage berm along Reach 1. On March 13, 2007 an interagency team of scientist representing the USACE, USFWS, USEPA, and FDEP used the Uniform Mitigation Assessment Method (UMAM) to assess the quality and value of wetland habitat that will be impacted through implementation of the preferred alternative, specifically areas that would be directly impacted through backfilling of the toe ditch wetlands and adjacent wetlands within the existing ROW with a partial seepage berm. Approximately 40.5 acres of toe ditch and adjacent wetlands within the USACE's existing ROW will be backfilled along the span of Reach 1 from implementation of the partial seepage berm. This would eliminate the foraging potential along these ditches. Although these areas provide less than optimal habitat, a variety of wading birds, small fishes and invertebrates utilize the ditches. Impacts would require mitigative measures. Applying the UMAM it was calculated that 12.8 relative functional gain (RFG) units of compensatory mitigation would be required to offset project impacts.

Compensatory mitigation for the proposed work has already been completed. The Corps removed 57 acres of Melaleuca adjacent to Reach 2 (near the Alvin Ward Boat Ramp) and has maintained this area. Using the UMAM it was determined that this mitigation is equivalent to 17.1 relative functional gain (RFG) units. After deducting 3.8 RFG units for backfilling of the wetlands in the focus areas covered in the January 2007 EA, 13.3 RFG units remain from the completed mitigation. Since the preferred alternative will result in 12.8 functional loss units, we will apply the remaining 13.3 RFG units from the mitigation, resulting in 0.5 RFG units leftover.

See Appendix C for information on previously conducted mitigation and the RFG produced, the UMAM, the scoring sheets that were used to calculate the wetland functional loss units, maps of Reach 1, and photos of the different polygons assessed.

4.1.2 Threatened and Endangered Species

4.1.2.1 American alligator (*Alligator mississippiensis*)

No Action Alternative

The American alligator should incur only minimal short-term impacts in the event of a dike failure both waterward and landward of the HHD. Flexibility in habitat usage and mobility should allow this animal to survive in the Lake Okeechobee region even in the event of major water level drop. If a dike failure should occur during nesting season, the impacts waterward should be minimal since water levels are not expected to decrease significantly during such an event. However, the potential for impacting nests landward of the dike exists in the immediate vicinity of a breach.

Alternative No. 5

Impacts to the American alligator resulting from implementing Alternative No. 5 would be minimal to moderate. Any impacts would be limited to the immediate area of construction.

4.1.2.2 Eastern Indigo Snake (*Drymarchon corais couperi*)

No Action Alternative

The indigo snake would likely only be affected minimally in the event of a dike failure. Low utilization of areas waterward of the HHD, would limit potential impacts. The levee itself provides useable habitat for the indigo snake, but a dike failure would only directly affect animals in the immediate vicinity. Landward, this animal is rarely observed due to sub-optimal habitat. Any impacts would be minimal, and only in the immediate area of the dike failure.

Alternative No. 5

Impacts to the indigo snake resulting from implementing Alternative No. 5 would be minimal to moderate, and limited to the immediate area of construction. Considering the quality of existing habitat for the eastern indigo snake along the lower third of the HHD, construction impacts may occur, but impacts to snakes will be mitigated by proper implementation of an environmental protection plan (see Section 4.10 Environmental Commitments).

4.1.2.3 Bald Eagle (*Haliaeetus leucocephalus*)

No Action Alternative

The slightly lower water levels resulting from a dike failure should impact the bald eagle to a minimal extent. The expected decrease in water level is too minor to significantly affect its foraging activities around the lake.

Alternative No. 5

Impacts to the bald eagle resulting from implementing Alternative No. 5 are expected to be minimal. However, the existence of an active bald eagle nest could alter construction plans. An active nest within 660 ft (201 m) of the HHD would restrict construction activities during nesting

season. Surveys for active bald eagle nests would be conducted prior to construction. Bald eagle nesting areas would be subject to USFWS Nesting Protection Measures, where applicable.

Implementation of the selected alternative should not have any significant impacts to the bald eagle along the remaining reaches of the HHD.

4.1.2.4 Wood Stork (*Mycteria Americana*)

No Action Alternative

Impacts to the wood stork in the event of a dike failure would be minimal. Slightly lower lake levels could result in slightly less foraging habitat around the lake. Any nesting colonies could be deserted if de-watered at a critical nesting time during the year; however, reduction in lake level due to breaching would be minimal.

Alternative No. 5

Impacts to the wood stork resulting from implementing Alternative No. 5 would be minimal to moderate. The wood stork could potentially utilize the toe ditch and adjacent wetlands for foraging activities.

4.1.2.5 Everglade Snail Kite (*Rosthrhamus sociabilis plumbeus*)

No Action Alternative

Impacts to the snail kite's significant habitat around Lake Okeechobee would be minimal if there should be a major dike failure. The water level must be sufficiently stable to prevent loss of the apple snail through drying out of the surface. Water loss in this area, in the event of a dike failure would not be great enough to seriously affect successful foraging of the highly mobile snail kite.

Alternative No. 5

Impacts to the snail kite resulting from implementing this alternative would be minimal, and restricted to the immediate area of construction. Construction activities would be limited to the levee itself and the landward side of the levee where this animal doesn't forage extensively. Aside from temporal disturbance caused by the operation of heavy equipment, no impact is expected waterward either. Due to the relatively narrow littoral zone, this area provides minimal snail kite foraging habitat, so impacts are unlikely.

4.1.2.6 West Indian Manatee (*Trichechus manatus*)

No Action Alternative

Minimal impacts to the manatee are expected to occur in the event of a dike failure. Expected water level reductions would not be great enough to affect the animal's food supplies or exposure to boat-related injury or death.

Alternative No. 5

No impacts are anticipated to the manatee resulting from implementation of this alternative. Construction activities would be limited to the levee itself and the landward side where this animal does not occur.

4.1.2.7 Okeechobee Gourd (*Curbita okeechobeensis* o.)

No Action Alternative

Okeechobee gourd plants that are currently known to exist in the Lake Okeechobee region are limited to the shores of the lake inside of the HHD. Slightly lower lake levels resulting from a major dike failure would minimally impact the existing Okeechobee gourd population in this area. However, given its limited range and habitat requirements, any alteration in the hydrology where this plant currently exists could significantly damage the population. Impacts to these gourds would most likely occur with sustained high water events, rather than low.

Alternatives No. 5

Implementation of this alternative would not likely cause impacts to the Okeechobee gourd. This plant has not been recorded in recent years along the landward extent of Reach 1.

4.1.3 State Listed Species

4.1.3.1 Burrowing Owl

No Action

The No Action Alternative is not anticipated to impact the burrowing owl because the project area is not considered suitable habitat for this species.

Alternative No. 5

The Alternative No 5 is not anticipated to impact the burrowing owl because the project area is not considered suitable habitat for this species.

4.1.3.2 Tree Snail

No Action

The No Action Alternative is not anticipated to impact the tree snail because the project area does not contain tree snail habitat.

Alternative No. 5

The Alternative No 5 is not anticipated to impact the tree snail because the project area does not contain tree snail habitat.

4.1.4 Water Resources

No Action Alternative

The No Action Alternative would have minimal effect on recharge along Reach 1. However, in the event of a failure of the HHD, consequential flooding could have significant effects on agricultural lands in the area of the failure. The No Action Alternative allows current stability problems of the HHD to persist, which could lead to a major breach of the HHD during a substantial high water event. In addition, the disruption of agricultural water supply at a critical time during the growing season could have detrimental effects on the local economy. Additionally, loss of crops in the vicinity of the breach could be substantial if the breach were to occur in a heavily farmed area. Selection of the No Action Alternative could result in extensive consequences to agricultural lands around Lake Okeechobee, and along Reach 1.

Alternative No. 5

The Corps anticipates that there will be no effects on ground water based on the following:

- The partially penetrating test cutoff wall tip extends to elevation -20 ft for the majority of Reach 1A, with some portions extending to elevation -30 ft. In order to cutoff groundwater flow completely, the wall would have to extend down to the confining layer (the Hawthorne formation) which is at an elevation of approximately -200 ft. Since the partially penetrating cutoff wall depth does not extend to -200 ft elevation, groundwater will flow underneath the wall and return up to the shallower depths. See Figure 2-2.
- The partially penetrating cutoff wall is located in Subreach 1A. This location was identified because of the proximity to the St. Lucie Canal. Groundwater replenishment can occur from the canal to the landward side of the cutoff wall.

Landowners and water users in the area adjacent to HHD Reach 1A (C-44/S-308 to the L-8 Borrow Canal/CU-10A) currently receive water through rainfall, groundwater seepage (either from or towards the Lake) and through permitted surface water withdrawals from the St. Lucie Canal (C-44) and the L-8 Borrow Canal primary canals. For lands in between the primary canals, landowners also use HHD culvert structures CU-11 and CU-16 and their associated pumping stations to move Lake Okeechobee water up into their respective farm ditches for irrigation purposes. Surface water levels in the primary canals and in the respective farm ditches serve to maintain desirable groundwater levels on the landowner's properties. Should the cutoff wall reduce groundwater seepage out of the lake and towards the landward properties, any resultant landowner water needs can be met by either discharging from S-308 or CU-10A (subject to lake regulatory releases for water supply) to maintain primary canal levels or through the CU-11 and CU-16 pumping stations to maintain optimum farm ditch water levels.

For lands to the east of Reach 1A, regional groundwater typically flows from north to south and in a direction more parallel to the HHD. When Lake stages are lower than optimum groundwater levels in the farms, groundwater tends to flow towards the Lake. When Lake stages are higher than optimum groundwater levels in the farms, it is indicative of antecedent rainfall that itself tends to recharge groundwater in the farm lands. Thus, groundwater contribution from the Lake constitutes a small fraction of the water supply for the farms, occurs only in cases in which the Lake stage exceeds the farm water levels, is negligibly reduced by installation of the test cutoff wall and can be mitigated for by permitted surface water withdrawals.

Instrumentation will be installed to measure the actual effect of the test cutoff wall within Reach 1A. If the study and the instrumentation indicate that the groundwater has been adversely affected a mitigation program will be initiated. Also, a regional groundwater study will be performed prior to implementation of a cutoff wall in Subreaches 1B through 1D.

4.1.5 Socioeconomics

No Action

The No Action Alternative would not provide a safe and reliable dike; without dike rehabilitation you are placing personal safety on the line and therefore the No Action Alternative is an unacceptable alternative.

Alternative No. 5

There are no anticipated long-term socioeconomic impacts associated with implementation of the preferred alternative. Positive impacts to the economy will be created by the availability of construction jobs for individuals and/or small businesses, causing a decrease in unemployment for the surrounding towns.

There will be temporary impacts to recreational activities on the lakeside of the HHD near the construction site. Temporary closure of some recreational parks may also result. These few inconveniences are far outnumbered by the tremendous benefit to public safety that will accompany the preferred alternative.

The project will not impact agriculture in this region; no impacts are anticipated to the regional ground water (see water resources section).

No impacts are anticipated to commercial navigation because the HHD Reach 1 preferred alternative will not cause any structural blockage of any navigational waters.

4.1.6 Cultural Resources

No Action

The No Action Alternative, with its continued potential for dike failure and catastrophic flooding, could lead to loss of portions of HHD itself and nearby historic properties.

Alternative No. 5

Coordination and consultation with the Florida State Historic Preservation Officer (SHPO), and other interested parties has been conducted in accordance with the National Historic Preservation Act, as amended (PL 890665); the Archeological and Historic Preservation Act, as amended (PL 93-29; Executive Order 11593 and appropriate Florida Statutes. Initial consultation with the SHPO on Reach 1 was initiated August 3, 1998, and the SHPO concurred with the Corps' no adverse effect determination on Reach 1 in an April 7, 2005 response. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

If there are cultural or archeological finds during construction activities on Herbert Hoover Dike, such observations shall be reported immediately to the Site Supervisor so that the appropriate Corps staff and Florida SHPO will be notified to assess the significance of the discovery and devise appropriate actions pursuant to 36 CFR 800.13. Examples of historic, archeological and cultural resources are bones, remains, artifacts, shell, midden, charcoal or other deposits, rocks or coral, evidences of agricultural or other human activity, alignments, and constructed features. Based on the circumstances of the discovery, equity to all parties

and in consideration of the public interest, the Corps may cease all activities that may result in the destruction of these resources, suspend all work in accordance with 36 CFR Part 800 and Florida State Regulations 872.05.

Human Remains are not anticipated to be recovered from this project. In the unlikely event that human remains are identified they will be treated in accordance with State Regulations 872.05(5). As the Herbert Hoover Dike is on lands owned by the State of Florida and in accordance with Corps Regulation ER 1105-2-100 Appendix C-4.e.(2), The Native American Graves Protection and Repatriation Act does not apply.

4.1.7 Recreational Resources

No Action

Moderate adverse impacts to recreation resources would be anticipated without major repairs to the dike. Piping and boils would continue, requiring emergency repairs to attempt to keep up with the frequency of breaches in the dike. Areas affected would be closed off during construction for safety purposes, with the inclusion of possibly damaged areas awaiting repairs.

Alternative No. 5

Temporary, short-term impacts are anticipated to parks, campgrounds, bank fishing, and bike trail access to select lake side locations as a result of construction activities and/or access of construction site, equipment, and staging areas. Specifically, some effects to the paved Lake Okeechobee Scenic Trail (LOST) atop the HHD may occur during project construction. Construction activities may limit access to certain parts of the trail, and parts or the trail may be removed.

In Reaches 1A and 1B of the HHD, the LOST is unpaved. In these subreaches the LOST will be restored consistent with Army O&M requirements.

In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:

1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail.
2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation.
3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.

4.1.8 Hazardous, Toxic, and Radioactive Wastes

The project conditions assume that any HTRW found during any phase of the project would be remediated in accordance with local, state and Federal laws. Therefore, it can be assumed that conditions at future construction sites will be contamination free or of low levels, which would include de minimis conditions that generally do not present a material risk of harm to public health or the environment.

No Action

Implementation of the No Action alternative would not impact HTRW in the project area.

Alternative No. 5

Implementation of the preferred alternative is not anticipated to contribute to HTRW in the region. The proposed earth moving activities involve the temporary and permanent displacement of HHD earthen materials. These earthen materials are expected to be free of HTRW given that they were largely placed in the dike by hydraulic means over 50 years ago.

4.1.9 Aesthetics

No Action

Impacts to aesthetics in the short term are anticipated as piping and boils ruin the integrity of the dike and patches and temporary emergency construction to these areas are ongoing. If these conditions continue without full scale repairs to the dike, aesthetics and safety would be compromised as emergency repairs continue to try and keep up with frequency, construction is continuing, portions of the dike are closed from access, and dust and noise around active construction areas are continual.

Alternative No. 5

Temporary, short-term impacts to localized areas would result due to construction. Impacts to aesthetic resources within the project area would be due to construction activities and/or access of construction equipment through lands designated for staging, access and construction as well as possible vegetation and tree removal.

4.1.10 Noise

No Action

The No Action Alternative would not increase ambient noise levels in the vicinity of the HHD. Therefore no impacts are expected to result due to selection of this alternative.

Alternative No.5

The implementation of any of the alternatives could potentially result in some noise impacts, but would be limited to the sites directly associated with construction activities. Occasional heavy machinery activity in these areas would produce noise levels above 70 dB in localized areas, but would occur sporadically and should not lead to reduced attenuation of animal species or humans living near the area. Staging areas that would be established at suitable locations within the Corps right-of-way may experience potential noise impacts, as well as access routes to the crown road. Such routes include the following:

- a. County Road 717 near S-351
- b. Hooker Highway off SR 15
- c. Paul Rardin Park off SR 715
- d. Culvert 12A off SR 715
- e. Culvert 10 off SR 715
- f. Pahokee State Park off SR 715
- g. S-352 off SR 715
- h. Culvert 10A off SR 15/700
- i. Culvert 14 off SR 15/700
- j. Port Mayaca (S-308) off SR 15/700.

4.1.11 Air Quality

No Action

Selection of the No-Action Alternative would not impact air quality in the vicinity of the HHD.

Alternative No. 5

Emissions associated with this alternative would be largely generated from heavy machinery operating for short periods in the area of Reach 1. Construction activities would cause minor short-term air quality impacts in the form of fugitive dust or airborne particulate matter from earthwork and unpaved roads accessed for the project. The area is rural and the existing air quality is good to moderate, additional short-term loadings of internal-combustion engine gases would not substantially impact the quality of the air in the vicinity of the HHD. Every Federally funded project must be consistent with state plans for implementing the provisions of the Clean Air Act Amendments (State Implementation Plans). This project is in conformance with the State Implementation Plan and Clean Air Act Section 176 because it would not cause violations of the National Ambient Air Quality Standards.

TABLE 4-1: ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ALTERNATIVES

ENVIRONMENTAL FACTOR	NO ACTION ALT	ALT NO. 5 (PREFERRED ALT)
THREATENED AND ENDANGERED SPECIES	No significant impacts to protected species expected.	No significant impacts to protected species are expected. Memoranda from field analyses document that soils in the lower levee toe are frequently saturated with water and do not provide adequate burrowing habitat for indigo snakes. Specifics on monitoring of endangered species are available under Section 4.10 - Environmental Commitments.

ENVIRONMENTAL FACTOR	NO ACTION ALT	ALT NO. 5 (PREFERRED ALT)
STATE LISTED SPECIES	No significant impacts to state listed species expected.	<p>Memoranda from field analyses document that soils in the lower levee toe are frequently saturated with water and do not provide adequate burrowing habitat for burrowing owls.</p> <p>Tree snails are a species of special concern, however the project area does not contain habitat for the tree snail because the project is within the Corps existing right-of-way.</p>
FISH AND WILDLIFE RESOURCES	The implications to fish and wildlife landward of the HHD that may result from dike failure would be limited to the areas of the breach and surrounding habitats. In the area of Reach 1, fish and wildlife habitat is marginal. However, those animals most significantly affected by extensive flooding include those with limited mobility. Amphibians, reptiles, and small mammals would be impacted to a moderate degree.	Existing toe ditch wetlands and adjacent wetlands within the USACE's existing ROW will be converted to a partial seepage berm. This activity would eliminate the foraging habitat for wading birds, reptiles, and amphibians, along these wetland areas.
WETLANDS	Selection of the No Action Alternative would lead to minimal wetland impacts if there should be a failure of the HHD system. These impacts would result from increased water levels due to flooding landward of the HHD.	Approximately 40.5 acres of toe ditch and adjacent wetlands within the USACE's existing ROW will be backfilled along the span of Reach 1 from implementation of the partial seepage berm. Using the UMAM it was determined that the 40.5 acres of wetlands backfilled is equivalent to 12.8 functional loss units. The Corps has already completed mitigation, as recommended in the FWS 2001 CAR, to compensate for the backfilling of these wetlands.

ENVIRONMENTAL FACTOR	NO ACTION ALT	ALT NO. 5 (PREFERRED ALT)
WATER QUALITY	The No Action Alternative would cause no effects on existing water quality.	Implementation of Alternative No. 5 is expected to cause temporary minimal impacts on the water quality along Reach 1. Construction activities could result in increased sediment load in the nearby surface waters of toe swales of the dike. However, silt screens and other erosion and turbidity control devices will be used as well as the implementation of Best Management Practices (BMPs) to minimize the discharge of water containing excessive turbidity. These preventive measures will be included in an Environmental Protection Plan (EPP).
HISTORIC PROPERTIES	Potential significant adverse effects in event of dike failure.	Coordination and consultation with the Florida State Historic Preservation Officer (SHPO), and other interested parties has been conducted in accordance with the National Historic Preservation Act, as amended (PL 890665); the Archeological and Historic Preservation Act, as amended (PL 93-29; Executive Order 11593 and appropriate Florida Statutes. Initial consultation with the SHPO on Reach 1 was initiated August 3, 1998, and the SHPO concurred with the Corps' no adverse effect determination on Reach 1 in an April 7, 2005 response. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

ENVIRONMENTAL FACTOR	NO ACTION ALT	ALT NO. 5 (PREFERRED ALT)
RECREATION	<p>Moderate adverse impacts to recreation resources would be anticipated without major repairs to the dike. Piping and boils would continue, requiring emergency repairs to attempt to keep up with the frequency of breaches in the dike. Areas affected would be closed off during construction for safety purposes, with the inclusion of possibly damaged areas awaiting repairs.</p>	<p>Temporary/short-term impacts to parks, bank fishing, and bike trail, access to select lake side locations as a result of construction activities and/or access of construction site, equipment, and staging areas. Specifically, some effects to the paved Lake Okeechobee Scenic Trail (LOST) atop the HHD may occur during project construction. Construction activities may limit access to certain parts of the trail, and parts or the trail may be removed.</p> <p>In Reaches 1A and 1B of the HHD, the LOST is unpaved. In these subreaches the LOST will be restored consistent with Army O&M requirements.</p> <p>In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:</p> <ol style="list-style-type: none"> 1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail. 2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation. 3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.

ENVIRONMENTAL FACTOR	NO ACTION ALT	ALT NO. 5 (PREFERRED ALT)
AESTHETICS	Impacts to aesthetics in the short term are anticipated as piping and boils ruin the integrity of the dike and patches and temporary emergency construction to these areas are ongoing. If these conditions continue without full scale repairs to the dike, aesthetics and safety would be compromised as emergency repairs continue to try and keep up with frequency, construction is continuing, portions of the dike are closed from access, and dust and noise around active construction areas are continual.	Temporary/Short-term impacts to localized areas as a result of construction. Possible vegetation & tree removal.
SOCIO-ECONOMICS	Flooding may result in loss of property and life.	Beneficial impacts from local jobs created during construction.
ENERGY REQUIREMENTS AND CONSERVATION	Field office manual labor and construction equipment fuel, to mitigate seepage from piping and boils with sand bagging and other fill material. Filling of sink holes.	Fuel for the construction machinery.
PUBLIC HEALTH AND SAFETY	Decreased factor of safety (F.S.) at critical areas of dike, increased risk of a breach or failure leading to loss of life and property. Risk involved with mitigating seepage from piping and boils with sand bagging and other fill material.	Increased public health and safety, no adverse impacts to public health and safety.

4.2 ENVIRONMENTAL CONSEQUENCES OF PREVIOUSLY CONSIDERED ALTERNATIVES

Environmental Components	No Action Alternative	Alternative No. 1 Stability berm/ culvert/ditch	Alternative No. 2 Lakeside cut-off wall/stability berm	Alternative No. 3 Seepage berm/relief trench/French drain	Alternative No. 4 Hanging seepage cut- off wall/relief
Location & Climate	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)
Topography	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)
Geology	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)
Soils	Potential for displacement of soils nearest dike failure (3)	Displacement of soils during excavation of peat in toe ditch (1)	Displacement of levee soils for cutoff wall, & peat during excavation of toe ditch (1)	Displacement of soils during excavation of toe ditch (1)	Displacement of levee soils for cut-off wall and relief trench (1)
Hydrology	Flooding may affect existing evaporation and recharge regime(3)	Elevated water level in toe ditches may result in localized flooding (2)	Cutoff wall may lower water table and recharge rates (2)	Perforated culverts in relief trench should not lower recharge rates (1)	Hanging cutoff wall reduces hydrology only in HHD footprint. (1) Minimal effects to water table or recharge rates.
Water Supply	Reduced ag. water supply at critical times may damage crops (2)	Loss of tail-water control by private interests may cause conflict (2)	Cutoff wall may reduce tail-waters and ag. water supply (2)	Water Supply not significantly affected (1)	Alternative would not significantly affect water supply.
Water Quality	Increased sediments in surface waters due to flooding (2)	Erosion control efforts during construction should minimize impacts (1)	Erosion control efforts during construction should minimize impacts (1)	Erosion control efforts during construction should minimize impacts (1)	Erosion control efforts during construction should minimize impacts (1)
Water Management	Short-term alteration of current water management practices likely (2)	Loss of tail-water control by private interests may cause conflict (2)	Current water management practices not significantly affected (1)	Current water management practices not significantly affected (1)	Current water management practices not significantly affected (1)

0 = No Consequences 1 = Minimal Consequences 2 = Moderate Consequences 3 = Extensive Consequences

Environmental Components	No Action Alternative	Alternative No. 1	Alternative No. 2	Alternative No. 3	Alternative No. 4
Vegetation & Cover Types	Native vegetation and crops could be damaged by floodwaters (3)	Impacts limited to vegetation along levee and in/around toe ditches (1)	Impacts limited to vegetation along levee and in/around toe ditches (1)	Impacts limited to vegetation along levee and in/around toe ditches (1)	Impacts limited to vegetation along levee in HHD footprint (1)
Wetlands	Significant wetland impacts not expected (1)	Significant wetland impacts not expected (1)	Cutoff wall may reduce water supply to landward wetlands nearest HHD (2)	Some wetlands would be converted to covered culverts (2). Mitigation would be required.	Hanging cutoff wall allows seepage under HHD. Water supply to toe ditch wetlands should remain unaffected (1)
Fish & Wildlife	Loss of some wildlife habitat in vicinity of breach (2)	Periodic increase of landward waters may alter some wildlife habitat (1)	Cutoff wall may reduce water supply altering wildlife habitat (2)	Covered culverts would eliminate some foraging habitat along existing toe (2)	Habitat provided by toe ditch would not be eliminated or converted to closed conduit since relief trench adjacent to ditch (1)
Threatened & Endangered Species	No significant impacts to T & E species expected (1)	No significant impacts to T & E species expected (1)	No significant impacts to T & E species expected (1)	No significant impacts to T & E species expected (1)	No significant impacts to T & E species expected (1)
Noise	No Consequences Expected (0)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)
Air Quality	No Consequences Expected (0)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)	Minimal, temporary, and localized effects due to construction activities (1)
HTRW	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)	No Consequences Expected (0)
Land Use Agriculture	Extensive crop damage possible (3)	Loss of tail-water control by private interests may cause conflict (2)	Cutoff wall may reduce water supply producing localized affects to agriculture (2)	No significant impacts to agriculture is expected (1)	No significant impacts to agriculture is expected (1)
0 = No Consequences 1 = Minimal Consequences 2 = Moderate Consequences 3 = Extensive Consequences					

Environmental Components	No Action Alternative	Alternative No. 1	Alternative No. 2	Alternative No. 3	Alternative No. 4
Land Use Urban Land	Loss of property and life possible in worst case scenario (3)	No significant impacts to urban Land Use expected (1)	No significant impacts to urban Land Use expected (1)	No significant impacts to urban Land Use expected (1)	No significant impacts to urban Land Use expected (1)
Land Use Transportation	Flooding may damage roads and railroads (3)	No significant impacts to trans. Features expected (1)	No significant impacts to trans. features expected (1)	Seepage berm may extend into Railroad easement. (1)	No significant impacts to trans. features expected (1)
Land Use Transmission Lines	Flooding may damage transmission line structures, resulting in power outages (2)	Construction activities may necessitate temporary relocation of transmission lines (1)	Construction activities may necessitate temporary relocation of transmission lines (1)	Construction activities may necessitate temporary relocation of transmission lines (1)	Construction activities may necessitate temporary relocation of transmission lines (1)
Aesthetic Resources	No consequences expected (0)	Temporary/Short-term impacts to localized areas as a result of construction. Possible vegetation & tree removal (2)	Temporary/Short-term impacts to localized areas as a result of construction. Possible vegetation & tree removal (2)	Temporary/Short-term impacts to localized areas as a result of construction. Possible vegetation & tree removal (2)	Temporary/Short-term impacts to localized areas as a result of construction. Possible vegetation & tree removal (2)
Recreational Resources	Moderate impacts due to emergency repairs construction areas and areas of breaches and pipings closed off for safety purposes, (2)	Temporary/Short-term impacts to parks, bank fishing, bike trail, access to select lake side locations as a result of construction (2)	More severe impacts to recreation as a result of construction on lakeside face of levee. Possible lake access restrictions, bank fishing, bike trail impacts. Moderate impacts to LOST. (2)	Temporary/Short-term impacts to parks, bank fishing, and bike trail, access to select lake side locations as a result of construction. Moderate impacts to LOST. (2)	Temporary/Short-term impacts to parks, bank fishing, bike trail, access to select lake side locations as a result of construction. Moderate impacts to LOST. (2)
Cultural Resources	Potential significant adverse effects in event of dike failure (2)	Minimal, non-adverse effects (1)	adverse effects (1) Minimal, non-adverse effects (1)	Minimal, non-adverse effects (1)	Minimal, non-adverse effects (1)
Socioeconomics	Flooding may result in loss of property and life (3)	No adverse consequences expected. Possible beneficial impacts to local economy due to construction (0)	No adverse consequences expected. Possible beneficial impacts to local economy due to construction (0)	No adverse consequences expected. Possible beneficial impacts to local economy due to construction (0)	No adverse consequences expected. Possible beneficial impacts to local economy due to construction (0)
0 = No Consequences 1 = Minimal Consequences 2 = Moderate Consequences 3 = Extensive Consequences					

4.3 CUMULATIVE IMPACTS

Cumulative impacts are defined in 40 CFR 1508.7 as those impacts that result from:

...the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.3.1 Past Actions

The Water Resources Development Act of 1992 authorized modifications to the C&SF Project for the Kissimmee River Restoration and the Headwaters Revitalization Projects. Project facilities include pumping stations, control and diversion structures, levees, canals, navigation locks, and railroad bridges. The project provided for an east coast protective levee extending from the Homestead area north to the eastern shore of Lake Okeechobee near St. Lucie Canal. Portions of Lake Okeechobee levees were enlarged, new levees on the northeast and northwest shores of the lake were constructed, the outlet capacity of the lake was increased, and floodway channels with control structures in the Kissimmee River Basin were constructed to prevent over drainage.

The canals, levees, water control structures, and pump stations constructed and modified under the C&SF Project provide flood protection for central and south Florida. However, the C&SF Project has created many problems by converting nearly half of the original Everglades ecosystem to agricultural and urban uses. Natural habitats have been reduced or lost; changes in hydrology have altered the Everglades topography through drainage, soil oxidation, subsidence, and burning; and rivers and estuaries have been subjected to large-volume nutrient-laden discharges from Lake Okeechobee.

Section 528 of the Water Resources Development Act (WRDA) of 1996, entitled *Everglades and South Florida Ecosystem Restoration*, authorized a number of ecosystem restoration studies, formerly referred to as "the Restudy," and now collectively known as the Comprehensive Everglades Restoration Plan (CERP), to attempt to restore some of the natural flows from Lake Okeechobee to the Everglades. The USACE submitted a report to Congress on July 1, 1999, containing the CERP blueprint. The plan was approved as part of WRDA 2000.

4.3.2 Incremental Effects of the Current Action

The rehabilitation of HHD Reach 1 has incremental effects that contribute to past projects' cumulative effects on the human and natural environment.

4.3.2.1 Human Environment

Past actions have resulted in a dike system that, although state-of-the-art when it was completed, is now recognized as substandard. The incremental effect of the Recommended Plan is a major beneficial contribution to cumulative effects of past, present, and reasonable foreseeable projects to protect public health and safety.

4.3.2.2 Natural Environment

Cumulative impacts associated with past actions have produced a natural environment that is markedly different from that of 150 years ago. However, valuable ecosystems still exist both landward and lakeward of the HHD. The proposed project would place fill in wetland habitats adjacent to the HHD. The Recommended Plan for Reach 1 would result in the filling of up to 40.5 acres of wetlands, including those fringing the toe ditch within the ROW along Reach 1. The total functional loss of wetlands from improvements to Reach 1 is calculated as 12.8. However, the USACE has provided full onsite compensation for wetland losses to ensure that no net loss of wetland function would occur. See Appendix C for more information.

Minor impacts to fish and wildlife are likely to occur due to implementation of the preferred alternative. The foraging habitat for wading birds in the landward-side ditches would be reduced through implementation of the Preferred Alternative. However, considering the low-to-moderate quality of these ditches as foraging habitat, and the availability of an extensive network of comparable ditches in the area, this impact is minor. Adverse impacts to protected species are not anticipated. There is no critical habitat for listed endangered species along the landward toe of the HHD in Reach 1. See Appendix D for correspondence with USFWS

4.3.2.3 Lake Okeechobee Operations

The repair and rehabilitation of the reaches will affect the manageability of Lake Okeechobee. Once the dike is repaired, lake levels can fluctuate closer to historical conditions without jeopardizing the stability of the dike or the communities adjacent to the dike.

4.3.2.4 Water Resources

The St. Lucie canal between Reaches 1 and 7 feeds the estuaries associated with the St. Lucie Inlet on the east coast, while the Caloosahatchee Canal feeds the Caloosahatchee River Estuary on Florida's west coast. HHD improvements would provide incremental benefits to estuaries by providing more flexibility for water storage and reducing the need to discharge large volumes over relatively short periods.

4.3.3 Current and Reasonable Foreseeable Future Actions

The USACE anticipates completing reconstruction of HHD in the remaining reaches around Lake Okeechobee.

In addition, the Lake Okeechobee Regulation Schedule Study (LORSS) has been initiated to address continued high lake levels, estuary ecosystem conditions, and lake ecology conditions that have occurred since 2003. The need for a new regulation schedule has been established by the continued deterioration of the Lake Okeechobee littoral zone and both the Caloosahatchee and St. Lucie estuaries. The recommended regulation schedule represents the best operational compromise to improve the environmental health of certain major C&SF ecosystems, while providing for public health and safety and the safe operation of the HHD. A new draft regulation schedule for Lake Okeechobee, with an expected completion of spring 2007, will balance the environmental health of these ecosystems while providing for public health and safety.

Other current and reasonably foreseeable future actions, the effects of which would affect cumulative impacts, include:

- Hillsboro (Site 1) Impoundment and ASR – This project would supplement water deliveries to the Hillsboro Canal during dry periods, thereby reducing demands on Lake Okeechobee and Loxahatchee National Wildlife Refuge.
- C-44 Basin Storage (C&SF Restudy Component - "B") – This component is expected to provide significant regional water quality benefits, specifically to the St. Lucie River and Estuary and the Indian River Lagoon, in the form of nutrient reduction. In addition, it will enhance the opportunity to moderate damaging releases to St. Lucie estuary from Lake Okeechobee and the surrounding basin, while providing freshwater for the estuary in the dry season for restoration. Benefits include improved health of the St. Lucie Estuary and Indian River Lagoon.
- Lake Okeechobee Tributary Sediment Dredging & Phosphorus Removal – The purpose of this feature is to remove phosphorous in canals located in areas of the most intense agriculture in the Lake Okeechobee watershed.
- Everglades Agricultural Area (EAA) Storage Reservoirs (Phase-1) – This project would improve timing of environmental deliveries to the Water Conservation Areas while reducing damaging flood releases from the Everglades Agricultural Area to the Water Conservation Areas, reducing Lake Okeechobee regulatory releases to estuaries, meeting supplemental agricultural irrigation demands, and increasing flood protection within the Everglades Agricultural Area.
- Lake Okeechobee Aquifer Storage & Recovery Pilot – The goal of this pilot project is to identify the most suitable sites for the aquifer storage and recovery wells near Lake Okeechobee and to identify the optimum configuration of those wells. Additionally, the pilot project will determine the specific water quality characteristics of waters to be injected.
- Lake Okeechobee Water Retention/Phosphorus Removal Project Water Control Plans: These plans include Taylor Creek (Grassy Island) Stormwater Treatment Area (STA) and Nubbin Slough (New Palm) Stormwater Treatment Area (STA). Construction of two large stormwater treatment areas, acquisition of land conservation easements, and removal of landowner improvements would restore wetlands and improve water quality by removing phosphorus from waters entering Lake Okeechobee.
- Kissimmee River Restoration Project – This restoration of natural flooding in the historic floodplain would reestablish wetland conditions and result in environmental benefits in the lakes in the lower basin southward to Lake Okeechobee.
- Seminole Big Cypress Water Conservation Plan – The intent of this plan is to improve the quality of agricultural water runoff within the reservation, restore storage capacity, and return native vegetation.

Many of the above projects are components of the Comprehensive Everglades Restoration Program (CERP). Once fully implemented, CERP will allow water deliveries and overland flow to follow patterns that are more natural throughout the south Florida ecosystem. Water managers will be better able to send water through canals than they are today, and store water for later use. CERP reservoirs will store excess water from Lake Okeechobee, receive flood control releases that would otherwise go to the estuaries, and collect stormwater runoff from developed areas.

The stored water will then improve high and low water levels in Lake Okeechobee, help meet environmental targets in the estuaries, Everglades and other natural areas, and supplement urban and agricultural water supply. These benefits collectively achieve the goals of restoration for CERP.

4.4 IRRETRIEVABLE OR IRREVERSIBLE COMMITMENT OF RESOURCES

Significant Federal funding would be irretrievably expended during the implementation of Alternative No. 5. In terms of natural resources, impacts are small and limited to the HHD footprint. The commitment of small, low quality wetland areas landward of the HHD (e.g. toe ditch) is irreversible, but has been compensated for by mitigation. Long-term displacement of some wading bird habitat is probably not a reversible action but is not significant in quantity compared to higher-quality wetlands surrounding the Lake, inside HHD littoral zone, along other canals and in the region.

4.5 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Unavoidable adverse effects that would result from implementation of this alternative include the following.

Topography, Geology and Soils

No significant adverse impacts to the topography, geology, and soils are likely to occur due to implementation of the preferred alternative.

Water Resources

Based on the configuration of the test cutoff wall (with tip between el. -20 for the majority of the Reach 1A, with portions to el. -30), the depth to the Hawthorne formation (the relatively impermeable barrier, at approximate el. -200 ft), the proximity to the St. Lucie River, and the land use characteristics adjacent to Subreach 1A; the Corps anticipates that there will be no effects on groundwater (see Section 4.3 - Water Resources).

Vegetation and Cover Types

No significant adverse impacts to the vegetation and cover types are likely to occur due to implementation of the preferred alternative. Minimal short-term impacts to vegetation as a result of construction and minor excavation for this alternative are expected. Minimal effects would occur only within the HHD footprint.

Wetlands

Some unavoidable permanent and direct adverse impacts to wetlands are likely to occur due to implementation of the preferred alternative. Excavation and fill of low quality wetlands will be required along the landward toe of the dike in order to accommodate construction of the proposed partial seepage berm. Approximately 40.5 acres of wetlands will be backfilled; the loss has been compensated for by off-site mitigation (see Appendix C).

Fish and Wildlife

Loss of fish habitat and wildlife disturbance are likely to occur due to implementation of the preferred alternative. The foraging habitat for wading birds in the landward toe wetlands would

be destroyed, 40.5 acres would be lost. Additionally, existing reptiles, amphibians, and fishes utilizing these ditches would be lost during this activity. This is a moderate loss, but considering the low quality of these ditches as foraging habitat, and the availability of an extensive network of comparable ditches in the area, not significant in extent.

Threatened and Endangered Species

Adverse impacts to threatened and endangered (T&E) species are not likely to occur due to implementation of the preferred alternative. The wood stork (a T&E species) has been observed near the toe ditch wetlands, these wetlands will be backfilled with implementation of the proposed project. However, because of the low quality of these wetlands and the existence of vast habitat provided by the Lake Okeechobee littoral zone and adjacent canals, the severity of the loss of habitat is considered minimal.

The Corps Endangered Species determination is “may affect, not likely to adversely affect”. The Corps is in compliance with the Endangered Species Act of 1973.

Noise

Minor localized noise related impacts during construction operations are expected to occur due to implementation of the preferred alternative.

Air Quality

Minor and localized air quality impacts during construction operations are expected to occur due to implementation of the preferred alternative.

Land Use

Some unavoidable adverse impacts to existing land use elements are likely to occur due to implementation of the preferred alternative. Local farms are not expected to notice changes in groundwater hydrology from the proposed test cutoff wall (see Water Resources section). The full seepage berm will require more land area than the current HHD easement provides, however the full seepage berm footprint has not been determined yet. Unavoidable impacts to homes, businesses, roads, and railroads will be address in the EIS for alternatives not within the existing ROW for Reaches 1-3.

Aesthetic Resources

Limited, short-term adverse impacts associated with construction activities would be imposed on aesthetic resources within the project area. These impacts may be mitigated by implementation of a well planned aesthetic measures plan which would account for unavoidable tree and native vegetation removal and dust from earth moving equipment among others. These impacts would be expected to be temporarily adverse at or near to parks, natural areas, residential or urban areas.

Recreation Resources

Temporary/short-term impacts are anticipated to parks, bank fishing, and bike trail, access to select lakeside locations as a result of construction activities and/or access of construction site, equipment, and staging areas. Specifically, some effects to the paved Lake Okeechobee Scenic

Trail (LOST) atop the HHD may occur during project construction. Construction activities may limit access to certain parts of the trail, and parts or the trail may be removed.

In Reaches 1A and 1B of the HHD, the LOST is unpaved. In these subreaches the LOST will be restored consistent with Army O&M requirements.

In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:

1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail.
2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. The haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation.
3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.

4.6 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Long-term benefits and short-term adverse environmental impacts represent tradeoffs between the local short-term use and the long-term benefits of a project. Long-term productivity would result from an improved HHD offering greater protection from catastrophic dike failure and flooding to the human and natural environments in the Lake Okeechobee area.

Short-term uses associated with the Recommended Plan include construction resources, dollars, and labor expended during road construction. They also include short-term construction-related inconveniences related to traffic flow, noise, businesses, recreation, and other environmental effects, as discussed in Section 4.0 of this document.

The long term beneficial effects of enhanced flood protection resulting from the implementation of the project greatly outweigh any unavoidable adverse impacts.

4.7 INDIRECT EFFECTS

Indirect effects are not anticipated from implementation of the preferred alternative. Local residents and farmers adjacent to the test cutoff wall in Reach 1 should not experience water supply and drainage impacts as stated under Water Resources in Section 4.5 - Unavoidable Adverse Environmental Effects.

4.8 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The objectives for this project are enhanced local flood control and public safety for property owners and residents close to Reach 1; this is compatible with federal, state, and local objectives.

4.9 CONFLICTS AND CONTROVERSY

The Sugar Cane Growers Cooperative of Florida had concerns regarding unique farmland, benefits of the levee system, and project segmentation.

4.10 ENVIRONMENTAL COMMITMENTS

The U.S. Army Corps of Engineers and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

(1) A survey for bald eagles' nests shall be conducted prior to any construction activities. A preliminary survey has been conducted by the Government, and it will be made available to the Contractor to include in his/her shop drawings.

1. A 660-foot no activity buffer zone shall be maintained around the nest under the following conditions: (a) building construction at any height, and (b) where the project footprint is any size, and (c) the activity will be visible from the nest, and (d) if there is no similar activity within 1 mile of the nest.
 - a. If there is existing tolerated activity for similar scope closer than 1 mile from the nest, the buffer zone may be adjusted to the same distance as that activity or structure occurs within the 660 feet.
2. A 330-foot no activity buffer zone shall be maintained around the nest under the following conditions: (a) building construction of any height, and (b) project footprint is ½ acre or less, and (c) the activity will not be visible from the nest, and (d) there is no similar activity within 1 mile of the nest.
 - a. If there is existing tolerated activity of similar scope closer than 1 mile from the nest, the buffer zone may be adjusted to the same distance as that activity or structure occurs within the 330 feet for any project footprint larger than 1/2 acre.
 - b. The Service and FWC recommend biological monitoring of the nesting territory if new development, specifically residential, commercial, and /or industrial construction, is proposed to occur within 660 feet of the nest tree during the nesting season (October 1-May 15, Service 1987). If the hatchlings fledge prior to the May 15 date, activity within the 660 foot buffer would be allowed.
 - c. There are limited exceptions where individual construction projects may be granted closer access to nests; this will be determined by USFWS Florida Ecological Field Offices (FEFO) staff. In the event that construction within the interior of the buffer is unavoidable within nesting season, the Bald Eagle Monitor Guidelines, September, 2006, will be implemented accordingly.

(2) Standard protection measures (standard environmental specifications to be followed by construction personnel) regarding the Eastern indigo snake will be followed during construction. These specifications have been developed for all projects by the Corps in collaboration with the

US Fish and Wildlife Service, and include hiring a snake monitor during construction, removal of any animals accidentally discovered and other measures to protect individual snakes.

(3) The Corps will conduct a survey for burrowing owls commensurate with that for bald eagle nests prior to issuance of any construction permits. The Corps will consult with the Florida Fish and Wildlife Conservation Commission (FFWCC) regarding adopting standardized protection measures should any owls be identified within Reach 1. Results will be coordinated with the USFWS and FFWCC.

If burrowing owls are found to be present in the project area, impacts will be minimized by altering construction schedules to avoid the nesting season and/or burrows will be cordoned off to avoid their direct destruction.

(4) Continued recreation planning will be performed during detailed project engineering and design. In addition, the appropriate FDEP representative will be contacted to insure collaboration on design features with the Scenic Trail Master Plan Coordination and the Lake Okeechobee Scenic Trail. An inventory of park amenities and utilities prior to construction would facilitate a rapid return to pre-construction state for those areas so impacted.

During construction, access to certain parts of the Lake Okeechobee Scenic Trail (LOST) would be restricted, and parts of the trail would be removed.

In Reaches 1A and 1B of the HHD, the LOST is unpaved. In these subreaches the LOST will be restored consistent with Army O&M requirements.

In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:

- The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail.
- As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation.
- The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.

(5) Construction crews will be made aware of the potential for the presence of the Okeechobee gourd. If the gourd is found, the Service will be notified.

(6) While construction crews are being briefed on the Environmental Protection Plan the following species will be included: gopher tortoises, Eastern indigo snakes, bald eagles, snail kites, wood storks, burrowing owls, and the crested caracara.

(7) The project will require a water quality certification under Chapter 373, F.S. and Sections 402 and 404 of the Clean Water Act. A permit application is underway.

(8) Turbidity screening and diversion will be used to control impacts to the drainage ditches and connected canals. Runoff from the construction site or from storms will be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, and by any measures required by area wide plans approved under paragraph 208 of the Clean Water Act. Temporary and permanent erosion and sedimentation control features or screening will be installed. Temporary velocity dissipation devices will be placed along drainage courses so as to provide for non-erosive flows. Temporary erosion and sediment control measures such as berms, dikes, drains, sediment traps, sedimentation basins, grassing, mulching, baled hay or straw, and silt fences will be maintained until permanent drainage and erosion control facilities are completed and operative. For silt fences, the filter fabric is to be of nylon, polyester, propylene, or ethylene yarn of at least 50 lb/in strength and able to withstand a flow rate of at least 0.3 gal/ft sq/minute. It also would contain ultraviolet ray inhibitors and stabilizers and be a minimum of 36 inches in width.

In addition, during construction, the Corps or Contractor will be responsible to keep construction activities, including refueling and maintenance sites, under surveillance, management, and control to avoid pollution of surface, groundwaters, and wetlands. All operations will be controlled to minimize turbidity and would conform to all water quality standards as prescribed by Chapter 62-302, State of Florida, Department of Environmental Protection.

4.11 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.11.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and this Environmental Assessment was prepared in compliance with the National Environmental Policy Act.

4.11.2 Endangered Species Act of 1973

Consultation has been initiated and is ongoing, and will be completed upon coordination of the present Environmental Assessment. The Corps endangered species determination is “may affect, not likely to adversely affect” for the wood stork. This project is in compliance with the Act.

4.11.3 Fish and Wildlife Coordination Act of 1958

This project has been coordinated with the U.S. Fish and Wildlife Service (USFWS). The USFWS has agreed that the CAR completed for the 2005 EIS is adequate for this EA. The Corps endangered species determination is “may affect, not likely to adversely affect.”

4.11.4 National Historic Preservation Act of 1966 (Inter Alia)

Coordination and consultation with the Florida State Historic Preservation Officer (SHPO), and other interested parties has been conducted in accordance with the National Historic Preservation Act, as amended (PL 890665); the Archeological and Historic Preservation Act, as amended (PL 93-29; Executive Order 11593 and appropriate Florida Statutes. Initial consultation with the SHPO on Reach 1 was initiated August 3, 1998, and the SHPO concurred with the Corps’ no adverse effect determination on Reach 1 in an April 7, 2005 response. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

4.11.5 Clean Water Act of 1972

The proposed HHD repairs are subject to Section 404 of the Clean Water Act and would require Water Quality Certification from the FDEP. The Section 402(b) National Pollutant Discharge Elimination System (NPDES) permit will be required for construction activities that disturb more than 5 acres of land. This permit will be acquired prior to the initiation of construction.

The Corps currently has the following water quality certificates (WQC) as of March 2007.

- In Reach 1A, the Corps has a De minimus exemption (serves as WQC) to construct the seepage cutoff wall (DEP File # 0234604-001). This exemption covered the original cutoff wall design and the toe ditch French drain repair. This de minimus may be used for the revised Reach 1A test cutoff wall project.
- In Reach 1D, the Corps has a De minimus exemption (serves as WQC) to construct the seepage cutoff wall. The Corps is in the process of reaffirming this exemption to ensure

permit coverage for Fall 2007. (This reaffirmation process will begin once design details are available.)

- In Reach 1, the Corps has an Environmental Resource Permit (ERP) (serves as WQC) to construct emergency toe ditch backfilling repairs along 20,000 ft of high risk portions of Reach 1 (DEP File # 0234604-003), covered in previous EA.

The Corps is in the process of obtaining the following:

- The Corps has applied for a permit to construct 10,000 ft of seepage berm extension along the northern most portion of Reach 1A. This permit is expected to be issued by May 1, 2007 in time for Contract Bid opening.
- The Corps is seeking to reaffirm the Reach 1A Seepage Cutoff wall de minimus exemption to cover the new design scheduled for construction in Summer 2007.
- Additional permit coverage will be obtained for the remainder of the seepage cutoff wall and seepage berm repairs to Reach 1 once the designs are available.

4.11.6 Clean Air Act of 1972

This project has been coordinated with the Florida Department of Environmental Protection (FDEP), Air Quality Division.

No air quality permits would be required for this project. Per the EPA list, there are no air sheds in Florida that require source control or monitoring. Coordination with the EPA will be ongoing as detailed design information becomes available. This project is in full compliance with the Clean Air Act Section 176.

4.11.7 Coastal Zone Management Act of 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in the FEIS report (dated July 2005) as Annex D. State consistency review was performed during the coordination of the draft and final EIS. The Corps has determined that the proposed project is consistent with the Florida Coastal Zone Management Program. Continued concurrence is based on adequate resolution of issues identified by state agencies, specifically FDOT and FDEP coordination of impacts to the Lake Okeechobee Scenic Trail (LOST) and repairs, as well as activities involving FDOT right-of-ways and structures.

4.11.8 Farmland Protection Policy Act of 1981

No prime or unique farmland would be impacted by implementation of this project. The expansion of the seepage berm width beyond the ROW has not been determined yet. This will be calculated from the results of future modeling and design work. Any work outside of the ROW will be addressed in future NEPA documentation. The preferred alternative provides a significant improvement in seepage protection, in comparison to existing conditions. The complete project for Reach 1 does contemplate expansion of the seepage berm right of way as shown in

Figure 2-4 of this document. The complete project will include an expanded seepage berm. Additional lands may need to be acquired in some segments to achieve full seepage protection. Detailed design for the expanded seepage berm is not available. When a full project footprint is available it will be coordinated with stakeholders and affected parties. Prior to constructing the remainder of the project, the Corps must have modeling and other technical information. Once the information is generated, lands will need to be acquired by the non-federal sponsor.

With the 2007 hurricane season fast approaching the Corps wants to begin construction of the seepage berm now. The Corps also wants to reinitiate construction of the test cutoff wall in Reach 1A with the understanding that data collected on cutoff wall performance in this reach will be utilized in future design for other reaches and segments.

4.11.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

4.11.10 Estuary Protection Act of 1968

No designated estuary would be affected by project activities. This act is not applicable.

4.11.11 Federal Water Project Recreation Act

The effects of the proposed action on outdoor recreation have been considered and are presented in the Supplemental and Final EIS. Short-term impacts to the Lake Okeechobee Scenic Trail located on top of the dike will require close coordination with FDOT and FDEP in order to return the trail to pre-existing conditions and limit trail closure time. Continued recreation planning will be performed during detailed project engineering and design. The project is in full compliance.

4.11.12 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds would be affected by project activities. The toe ditch wetlands provide very little quality habitat for migratory birds. Alternative and higher quality habitats are available along the Lake Okeechobee shoreline and in adjacent canals. The project is in compliance with these acts.

4.11.13 E.O. 11990, Protection of Wetlands

The recommended plan entails permanent filling of wetlands landward of the toe within the existing ROW. These wetlands are of moderate to poor functional value. Using the UMAM the preferred plan will result in a relative functional loss of 12.8 units. As a result 12.8 relative functional gain units of mitigation are necessary to compensate for project impacts. The Corps has preformed 17.1 relative functional gain units of mitigation in anticipation of the preferred alternative in the 2000 MRR (scored using UMAM). Therefore, this project is in compliance with the goals of this Executive Order.

4.11.14 E.O. 11988, Flood Plain Management

The study is in full compliance. While the considered alternative has no impact on avoidance of development in the flood plain, the recommended plan will directly support a reduction in hazards and risks associated with floods and will minimize the impact of floods on human safety, health and welfare. The recommended plan will have no impact on the restoration and preservation of the natural and beneficial values of the base flood plain.

4.11.15 E.O. 12898, Environmental Justice

Executive Order 12898 requires the Federal government to review the effects of their programs and actions on minorities and low income communities. The study area is known to contain a significant percentage of low income and minority individuals. The preferred alternative that was formulated for the Herbert Hoover Dike would help to ensure the safety of those communities within the study area (e.g. Belle Glade and Pahokee) as well as residents living within the area anticipated to be impacted in the event of a project failure. In addition to ensuring the safety and well being of residents and their property, implementation of the recommended plan may have a significant beneficial effect on local communities through job creation, increased sale of construction material and other goods necessary to sustain a large construction force for the duration of the project. The project will not have disproportionate adverse effects on minority or low-income populations.

4.11.16 E.O. 13112, Invasive Species

Exotic and invasive plant species lost within drainage swales, connecting canals, wetlands, and some uplands within the project area. However, the project will not contribute to nutrient loading, or otherwise foster the spread of invasive species. In addition, some removal of invasive species will be necessary, and maintained, within the toe ditch swale. Exotic wildlife species are not anticipated to be affected. This project is in full compliance with the Act.

4.11.17 E.O. Conclusion

This project is in compliance with the following Executive Orders: 11990 Protection of Wetlands, 11988 Flood Plain Management, 12898 Environmental Justice, and 13112 Invasive Species.

5.0 LIST OF PREPARERS AND REVIEWERS

The following individuals listed in Tables 5-1 and 5-2 were responsible for contributing to the preparation, review and technical editing of the Draft EA.

5.1 PREPARERS

TABLE 5-1: LIST OF EA PREPARERS

Name	Affiliation	Discipline/Expertise	Role in Preparing Document
Nancy Allen	USACE	Biologist	Preparation of draft EA
Tien Ho	EPJV, USACE Contractor	Biological Engineer	Preparation of draft EA
Mark D. Shafer	USACE	Environmental Engineer	Water Quality and Permit acquisition
Dave Dollar	USACE	Engineering Technical Lead	Preparation of engineering sections of EA.

5.2 REVIEWERS

TABLE 5-2: LIST OF EA REVIEWERS

Name	Affiliation	Discipline/Expertise	Role in Preparing Document
Barbara Cintron	USACE	Chief of Environmental Branch, South Florida Section	NEPA Review
Pauline Smith	USACE	Project Manager	Review of Project Features
Jacob Davis	USACE	Geotechnical Engineer	Review of geotechnical portions of the EA
Martin Falmlen	USACE	Hydrology Engineer	Review hydrology portions of the EA
John Bretz	EPJV, USACE Contractor	Project Manager	Consistency Review

6.0 PUBLIC INVOLVEMENT

6.1 SCOPING AND ISSUES

Following the completion of the Independent Technical Review (ITR) a news release describing the design recommendations for the rehabilitation of HHD was released on October 5, 2006 to keep the public informed of the decisions resulting from the workshop.

The EA and proposed Finding of No Significant Impact (FONSI) for the focus area toe ditch backfilling were made available to the public by notice of availability dated 11 December 2006, pertinent correspondence regarding this proposed work is available in Appendix D of this report.

Informal consultation is in progress. Interagency participation with USFWS, EPA, FDEP, and the Corps has been ongoing. These agencies participated in the wetlands UMAM analysis on March 13 2007. USFWS is satisfied with existing CAR and its determinations. A scoping power point presentation on the preferred alternative was sent out to interested agencies on 28 March 2007. SHPO coordination is final and complete. Concurrence is expected with Corps determination to endangered species of "May affect, not likely to adversely affect."

The Sugar Cane Growers Cooperative of Florida had concerns regarding unique farmland, benefits of the levee system, and project segmentation.

6.2 AGENCY COORDINATION

The draft EA has been provided to all supporting agencies for review. Any comments received have been addressed in this final EA. Pertinent correspondence with agencies is available in Appendix D of this EA.

6.3 LIST OF RECIPIENTS

Table 6-1 lists those public and agency who received a hard copy of the draft EA. Table 6-2 lists recipients who received CD copy. Table 6-3 lists recipients of a notice of availability (NOA) letter.

The Final EA is posted on the Corps environmental planning website at:

<http://planning.saj.usace.army.mil/pdfs/Reach1EA.pdf>

TABLE 6-1: LIST OF HARD COPY RECIPIENTS

AGENCY	FIRST	LAST	COMPANY / DIVISION
Federal			National Marine Fisheries Service/Habitat Cons Div
Federal			U.S. Department of HUD
Federal			U.S. Army Corps of Engineers
Federal	Barry	Rosen	FISC
Federal	Jonathon	Deason	Department of the Interior MS 2340
Federal	David	Bernhart	NMFS
Federal	George	Hadley	Federal Highway Administration
Federal	Neal	McAlily	U.S. Department of Justice
Federal			FL DOT
State			Environmental Office (MS-37) Florida DOT
State			Okeechobee Field Station / SFWMD
State	Don	Nuelle	SFWMD
State			FL Department of Environmental Protection
State	Sally	Bradshaw	Governor's Office
State	Ernie	Barnett	FDEP - Ecosystem Planning
State			Division of Historic Resources
State	Kenneth	Haddad	FL Fish & Wildlife Conservation Commission
State			Legislative Library
State	Jeff	Schardt	FL Department of Environmental Protection - Bureau of Invasive Plant Management
State	Colleen	Castille	FL Department of Environmental Protection
County			Hendry County Administration
County			Okeechobee County Administration
County	Houston	Tate	Office of the City Manager
County	Steve	Wilson	City of Belle Glade
County			St. Lucie River Initiative
County			Osceola County Administration
County			St. Lucie County Administration
County			Glades City Board of County Commissioners
County			Glades County Administration
Association			Caloosahatchee River Citizens Association
Association			Friends of Lake Okeechobee
Association			Florida Wildlife Federation
Association			Sierra Club, Loxahatchee
Tribe	Steve	Terry	Miccosukee Tribe of Indians of Florida
Tribe	Terrance	Salt	South Florida Restoration Task Force
Tribe	Mitchell	Cypress	Seminole Tribe of Florida
Tribe	Craig	Tepper	Seminole Tribe of Florida
Tribe	Billy	Cypress	Miccosukee Tribe of Indians of Florida
Tribe	William	Steele	Seminole Tribe of Florida
Agricultural	Barbara	Miedema	Sugar Cane Growers Cooperative
Other			Okeechobee Board of County Commissioners
Other	Joseph	Spratt	Hendry County Board of County Commissioners
Other	Donald	Stilwell	Lee County
Other	Kevin	Henderson	St. Lucie River Initiative
Libraries			Clewiston Public Library

Libraries			Martin County Blake Library
Libraries			Okeechobee County Public Library
Libraries			Palm Beach County Library
Libraries	Doris	Cutshall	Barron Library
Federal			Department of Energy
Federal	Ron	Miedema	U.S. EPA
Federal			U.S. Fish and Wildlife Service
Federal			Everglades National Park
Federal			National Park Service
Federal			U.S. EPA, Region 4
Federal			U.S. Army Corps of Engineers, SAD, Planning
Federal	Paul	Souza	U.S. Fish and Wildlife Service
Federal			U.S. EPA
Federal			U.S. Department of Commerce/NOAA
State			SFWMD
Federal	Gary	Hardesty	U.S.A.C.E., Program Mgmt. Div./CECW-HQ02
Federal	Kenneth	Harvan	U.S. DOI Office of Environmental Policy and Compliance
State			Florida State Clearinghouse / FDEP

TABLE 6-2: LIST OF CD RECIPIENTS

AGENCY	FIRST	LAST	COMPANY / DIVISION
Federal			Bureau of Indian Affairs
Federal			FEMA Insurance & Mitigation Division
Federal	Richard	Harvey	U.S. EPA, Region 4
Federal	Mark	Bradford	Bureau of Indian Affairs
Federal			Federal Emergency Management Admin
Federal			7th Coast Guard District
Federal			U.S. Department of Agriculture
Federal			U.S. Geological Survey, WRD
Federal	Audra	Livergood	NOAA/National Marine Fisheries Service
Federal			Federal Maritime Commission
Federal	David	Rackley	NOAA/National Marine Fisheries Service
Federal	William	Leary	Council on Environmental Quality
Federal			Advisory Council on Historic Preservation
Federal	Ted	Center	U.S. Department of Agriculture, Aquatic Plant Lab
Federal			U.S. Forest Service - USDA
State			FL Dept of Agriculture & Consumer Services
State			Florida Power and Light
State			House Environmental Protection Committee
State	Brian	Barnett	Office of Environmental Service - FL Fish & Wildlife Conservation Commission
State			Everglades Protection & Restoration Program - FL Fish & Wildlife Conservation Commission
State			State Conservationist NRCS
State			Government Responsibility Council
State			Intergovernmental Affairs Policy Unit
Agricultural	Tom	Jones	South Florida Agricultural Council

Agricultural	Ken	Langeland	University of Florida Institute of Food & Agr. Sciences / Center for Aquatic Plants
Agricultural	Steve	Baumgartner	Chamber of Commerce
Agricultural	Robert	Daniels	South FL Regional Planning Council
Agricultural	Charles	Schoech	Highlands Glades Drainage District
Agricultural	John W.	Dunkelman	Florida Sugar Cane League, Inc.
Agricultural			Everglades Coordinating Council
Agricultural	John Ed	Burdeshaw	Okeechobee Chamber of Commerce
Agricultural	Jeff	Krauskopf	Martin Board of County Commissioners
Agricultural	Patrick	Gleason	Camp Dreser & McKee, Inc.
Marina & Fish Camp	David	Sutton	University of Florida IFAS Research Center
Other	Phillip	Parsons	Landers & Parsons
Other			SW Florida Watershed Council
Other	Susan	Brookman	South FL Watershed Council Inc.
Other	Thomas	Macvicar	Macvicar, Frederico & Lamb, Inc.
Other	Beverly	Jones	St. Lucie Initiative
Other	Patrick J.	Gleason	Camp Dreser & McKee, Inc.
Libraries			Pahokee Water Control District

TABLE 6-3: LIST OF NOA RECIPIENTS

HHD Reach 1 EA Notice of Availability Mailing List		
Position	Last	First
	Hastings	Alcee
	Nelson	Bill
	Martinez	Mel
Cultural and Historic Preservation Tribal Complex	Bear	Joyce
Tribal Historic Preservation Officer	Thrower	Robert
Tribal Historic Preservation Officer	Bowlegs	Pare
County Manager		
City Manager		
City Manager	Schenck	Kenneth
County Manager		
County Administrator		
County Administrator		
Mayor	Sasser	J.P.
State Director		
	Clark	Ruth
	Schock	Andrew
	Nelson	Wayne
	Brown	M. Kent
	Vitunac	Lace

	Darling	Art
	Platt	Vee
	Beer	Bryan
	Reed	Nathaniel
President	Larson, Sr.	Louis
	Collins	Joe
	Wade	Bubba
	Lima	Ricaardo
	Harvey	Charles
	Altman	Red
	Ramsey	Ron
	Hamel	Ron
	Brown	Warren
	Head	Carroll & Louise
	Byrd	Gail
Town Council President	Smith	Lesly
President	Jenkins	Wayne
District II County Commissioner		
County Manager	Stilwell	Donald
	Dearborn	Bonnie
Utility Director		
	Norton	Robert M.
	Oulette	Brian
	Smith	Vicki
	Hilliard	Cathy
	Hammock	Ardis
Indian Riverkeeper	Stinnette	Kevin
Pahokee Resident	Abernathy	Billy
Pahokee Resident	Adams	Terry
Pahokee Resident	Agudo	Felix
Pahokee Resident	Aguirre	Ponciano
Pahokee Resident	Aldape	Aucencio
Pahokee Resident	Allen	Francis
Pahokee Resident	Allen	Francis
Pahokee Resident	Anderson	Cynthia
Pahokee Resident	Anderson	Cynthia
Pahokee Resident	Babb	Keith

Pahokee Resident	Branch	Barbara
Pahokee Resident	Brewer	James
Pahokee Resident	Brown	Frederick
Pahokee Resident	Brown	Jessie
Pahokee Resident	Brown	Edna
Pahokee Resident	Bryant	Billy
Pahokee Resident	Burroughs	Rodger
Pahokee Resident	Camacho	Maria
Pahokee Resident	Camacho	Eulogio
Pahokee Resident	Campbell	Timothy
Pahokee Resident	Chicken INC	Pahokee
Pahokee Resident	Church	Lakeside Baptist
Pahokee Resident	Clinton	Bernard
Pahokee Resident	Conran	Donald
Pahokee Resident	Cortez	Salvador
Pahokee Resident	Cossio	Emundo
Pahokee Resident	Crady	Thelma
Pahokee Resident	Culberson	Joanne
Pahokee Resident	Dadesky	Philippe
Pahokee Resident	Dobrow	Leonard
Pahokee Resident	Elderly Facility LTD	Pahokee
Pahokee Resident	Findley	Cindy
Pahokee Resident	Fonseca	Lorenzo
Pahokee Resident	Fonseca	Lorenzo
Pahokee Resident	Fowler	William
Pahokee Resident	Gallo	Theodore
Pahokee Resident	Glen	Sharon
Pahokee Resident	Gonzalez	Delia
Pahokee Resident	Gordon	Lewis
Pahokee Resident	Graydon	Dwight
Pahokee Resident	Green INC	Apple
Pahokee Resident	Haslem	Willie
Pahokee Resident	Hatton	Denise
Pahokee Resident	Henderson	Helen
Pahokee Resident	Hodges	Iris
Pahokee Resident	Hyslope	Larry
Pahokee Resident	Hyslope	Rusty

Pahokee Resident	Hyslope	Kenneth
Pahokee Resident	Hyslope	Larry
Pahokee Resident	Ideas Educational	Bright
Pahokee Resident	Investment INC	Perez
Pahokee Resident	Jarriel	Wayne
Pahokee Resident	Jernigan	C D
Pahokee Resident	Jones	Ralph
Pahokee Resident	Kahook	Waseem
Pahokee Resident	Keenan	Lonnie
Pahokee Resident	Kennedy	William
Pahokee Resident	Law	Clarence
Pahokee Resident	Levins	Marvin
Pahokee Resident	Levins	Glen
Pahokee Resident	Lindrose	Margaret
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Nelson
Pahokee Resident	Lopez	Julio
Pahokee Resident	Marzi	Jacques
Pahokee Resident	McArthur	Gayle
Pahokee Resident	McKeehan	Elizabeth
Pahokee Resident	McKinstry	William
Pahokee Resident	McKinstry	Linda
Pahokee Resident	Metz	Richard
Pahokee Resident	Miller	Robert
Pahokee Resident	Mills	Patsy
Pahokee Resident	Mokos	Michael
Pahokee Resident	Moon	Georgie
Pahokee Resident	Mosley	Lorine
Pahokee Resident	Mosley	Ricky
Pahokee Resident	Mosley	Johnny
Pahokee Resident	Mosley	Rhonda
Pahokee Resident	Moss	Donald
Pahokee Resident	Moya	Manuel

Pahokee Resident	Murdoch	Sean
Pahokee Resident	Nasir	Mohammed
Pahokee Resident	Orduna	Caesar
Pahokee Resident	Otto	Norris
Pahokee Resident	Pace	Richard
Pahokee Resident	Pahokee	City of
Pahokee Resident	Pahokee	First United Methodist Church of
Pahokee Resident	Parker	W C
Pahokee Resident	Peaden	Curtis
Pahokee Resident	Peaden	Carol
Pahokee Resident	Perez	Edilia
Pahokee Resident	Perez	Merlin
Pahokee Resident	Perez	Edilia
Pahokee Resident	Perullo	Michael
Pahokee Resident	Pope	Barbara
Pahokee Resident	Prieto	Maria
Pahokee Resident	Raineri	Carlo
Pahokee Resident	Rawls	Billy
Pahokee Resident	Reed	Jimmy
Pahokee Resident	Reed	Terry
Pahokee Resident	Rodriguez	Pablo
Pahokee Resident	Rodriguez	George
Pahokee Resident	Rodriguez	Fernando
Pahokee Resident	Rosenstrauss	Paul
Pahokee Resident	Ruiz	Bonifacio
Pahokee Resident	Sanders	Gary
Pahokee Resident	Sawyer	Robert
Pahokee Resident	Schmidt	Daniel
Pahokee Resident	Sears	Thomas
Pahokee Resident	Shirley	William
Pahokee Resident	Simonson	Sandra
Pahokee Resident	Spence	Carol
Pahokee Resident	Suggs	V R
Pahokee Resident	Todd	Clifton
Pahokee Resident	Toribio	Noel
Pahokee Resident	Tulloch	Irvin

Pahokee Resident	Tulloch	Irvin
Pahokee Resident	Unwin	David
Pahokee Resident	Vann	WM E
Pahokee Resident	Varela	Hugo
Pahokee Resident	Wheeler	Gail
Pahokee Resident	Whipple	Janet
Pahokee Resident	Whitaker	Wayne
Pahokee Resident	Wilkinson	Margaret
Pahokee Resident	Wilkinson	Hilda
Pahokee Resident	Wilson	James
Pahokee Resident	Woodside	Michael
Pahokee Resident	Alfaro	Jose
Pahokee Resident	Baker	Veronica
Pahokee Resident	Baltazar	Jose
Pahokee Resident	Baltazar	Eric
Pahokee Resident	Baltazar	Jacinto
Pahokee Resident	Barbarito	Gerald
Pahokee Resident	Barbarito	Gerald
Pahokee Resident	Barnett	Richard
Pahokee Resident	Boe	Francis
Pahokee Resident	Boris	Neal
Pahokee Resident	Branch	Margie
Pahokee Resident	Bryant	Billy
Pahokee Resident	Bryant	Merlen
Pahokee Resident	Butler	Richard
Pahokee Resident	Carr	Charles
Pahokee Resident	Church	First Hispanic
Pahokee Resident	Collier	Darrel
Pahokee Resident	Collins	Annie
Pahokee Resident	Community Church	Glades Covenant
Pahokee Resident	Cook	Beulah
Pahokee Resident	Corbett	T L
Pahokee Resident	County	Palm Beach
Pahokee Resident	Crouch	David
Pahokee Resident	Davila	Jorge
Pahokee Resident	De Los Santos	Juan
Pahokee Resident	Dent	Armisha

Pahokee Resident	Development CO	Keen
Pahokee Resident	Diocese of Southeast FL	Episcopal
Pahokee Resident	Dixon	Scott
Pahokee Resident	Dixon	Paul
Pahokee Resident	Eccleston	Roy
Pahokee Resident	Esparza	Ezequiel
Pahokee Resident	Evans	Arthur
Pahokee Resident	Farms	Boe
Pahokee Resident	Farms	Boe
Pahokee Resident	Farms	Boe
Pahokee Resident	Farms INC	Camaro
Pahokee Resident	Foliage INC	Everglades
Pahokee Resident	Fountain	Katherine
Pahokee Resident	Fowler	W A
Pahokee Resident	Friend	Lewis
Pahokee Resident	God at Pahokee	Church of
Pahokee Resident	Gorham	Beverly
Pahokee Resident	Graham	William
Pahokee Resident	Gulley	Willie
Pahokee Resident	Harrison	Ron
Pahokee Resident	Harvey	Elvis
Pahokee Resident	Hatton	Barbara
Pahokee Resident	Henson	G J
Pahokee Resident	Henson	Wilbur
Pahokee Resident	Hickman	Willie
Pahokee Resident	Ice Manufacturing Corp	Florida
Pahokee Resident	Investments INC	Pahokee
Pahokee Resident	Investments INC	Pahokee
Pahokee Resident	Jarriel	D
Pahokee Resident	Jones	Bennie
Pahokee Resident	Kahok	Ahmad
Pahokee Resident	Kahok	Jamil
Pahokee Resident	Kay L Trust	Coppock
Pahokee Resident	Kelly	Dwayne
Pahokee Resident	Kennedy	Diane
Pahokee Resident	Kohr	Paul
Pahokee Resident	Korbly	Richard

Pahokee Resident	Ladd	Bruce
Pahokee Resident	Latimore	Milacoya
Pahokee Resident	Lawrence	Jamar
Pahokee Resident	Levins	Glenn
Pahokee Resident	Magana	Guillermo
Pahokee Resident	Meister	Michael
Pahokee Resident	Mickins	Bud
Pahokee Resident	Morales	Moises
Pahokee Resident	Mosley	Steve
Pahokee Resident	Munson	Christa
Pahokee Resident	Myers	Mary
Pahokee Resident	National Bank	First Union
Pahokee Resident	of God of Prophecy	Church
Pahokee Resident	of Palm Beach INC	T&M
Pahokee Resident	of the Nazarene	Church
Pahokee Resident	Oil INC	Berner
Pahokee Resident	Pahokee	City of
Pahokee Resident	Pahokee	City of
Pahokee Resident	Pahokee	City of
Pahokee Resident	Pahokee INC	First Methodist Church of
Pahokee Resident	Pantoja	Jose
Pahokee Resident	Pelham	Kipert
Pahokee Resident	Pender	John
Pahokee Resident	Potter	D T
Pahokee Resident	Potter	Douglas
Pahokee Resident	Public Instruction	Board of
Pahokee Resident	Rentals INC	Lake
Pahokee Resident	Resendiz	Antonio
Pahokee Resident	Ricardo	Gloria
Pahokee Resident	Robinson	Beverly
Pahokee Resident	Rodriguez	Armando
Pahokee Resident	Salvatore	Theresa
Pahokee Resident	Sasser	Faith
Pahokee Resident	Sasser	James
Pahokee Resident	Sasser	James
Pahokee Resident	Shirley	Barbar
Pahokee Resident	Simmons	Larry

Pahokee Resident	Spell	Rosalinda
Pahokee Resident	Storage LLC	Save a Buck
Pahokee Resident	Storage LLC	Save a Buck
Pahokee Resident	Tel & Tel CO	Southern Bell
Pahokee Resident	Thomas	Emmett
Pahokee Resident	Torres	Angel
Pahokee Resident	Tulloch	Irvin
Pahokee Resident	Verduzco	Olga
Pahokee Resident	Vickers	Edward
Pahokee Resident	Webb	Jimmy
Pahokee Resident	Whitaker	Allen
Pahokee Resident	Wilder	Howard
Pahokee Resident	Wilson & Son INC	J E
Pahokee Resident	Zaccagnino	D L
Pahokee Resident	Zelaya	Jose

6.4 COMMENTS RECEIVED AND RESPONSE

Table 6-4 will be included summarizes the public / agency comments received and the USACE response. All public / agency correspondence will be included in its entirety in Appendix D – Pertinent Correspondence.

TABLE 6-4: COMMENT RESPONSE MATRIX

Letter	Public / Agency Comment	USACE Response
Environmental Protection Agency (EPA)-1	Page 23, 4.1.1 Wetlands: Per UMAM, the document should correct “acres” to “functional units” and state “Applying the UMAM it was calculated that 12.8 functional units would be necessary to offset project impacts.”	Concur. The change has been incorporated into the final document.
EPA-2	Page 32, Table 4-1, Environmental Consequences of the Proposed Alternatives (Wetlands). The table states 40.5 acres of wetland impacts, while the text on page 23 states 40.2 acres.	The correct acreage is 40.5. The correction has been incorporated into the final EA.
EPA-3	Page 37-4.2 Environmental Consequences of Previously Considered Alternatives. Additional mitigation may be necessary to offset secondary impacts to any wetlands located outside the footprint of the project due to a reduction in hydrology.	The main reason for eliminating alternative 2 was the lakeside location of the cutoff wall, which left the wall susceptible to overtopping during extreme events and erosion during wave attack. Further, the landside toe treatment in this alternative would not provide the desired level of protection. The potential impacts to ground water were also unknown; however, alternative 5 proposes a test cutoff wall only in subreach 1A; whereas alt 2 proposed a cutoff wall for the entire Reach 1. This location was chosen adjacent to the St. Lucie canal because ground water replenishment can occur from the canal to the landward side of the test cutoff wall. The team will monitor potential impacts of the test cutoff wall and analyze data from a regional ground water model prior to implementation of a partially penetrating cutoff wall along all of Reach 1. If impacts are realized from these analyses, then mitigation would occur to offset these impacts.

EPA-4	Appendix C, Section C-1, UMAM Calculations: UMAM impacts are quantified in "Functional Loss" and Mitigation is quantified in "Relative Functional Gain.	The correction has been made.
EPA-5	Appendix C, Table C-1 Mitigation Necessary: Change acres to functional units. Provide information as to where the impacts occurred within the 16 assessment areas in Table C-1. Calculation should show an additional need for 3.3 credits.	Acres have been changed to functional loss. Table C-1 includes the location of each assessment area by station numbers which correlate to the maps in Appendix C. The width of the assessment areas fall within the Corps existing right-of-way which is also delineated on the maps in Appendix C. The 16 UMAM assessment areas scored DID include the toe ditch focus areas. Therefore, the functional loss units for the focus area backfill were deducted from the total functional loss scored. No additional credit is necessary. A balance of 0.5 relative functional gain units still remains. The 3.8 units has already been calculated in the first EA, for the priority toe ditch work and there from is subtracted from our total.
EPA-6	Appendix C, UMAM sheet for Subreach A-1TD. Functional loss listed as .4 should be .5.	Concur. The change has been made.
United States Geological Survey(USGS) -1	Section 4.1.3 Water Resources, Alt No.5, pg 26 - this section indicates that the cutoff wall for alternative 5 is expected to have no effect on ground water; however alternative 2 was not selected in part because the cutoff wall would have possible effects on the local ground-water regime. The text should explain the fundamental difference between the two walls that accounts for the potential effects of the alternative 2 wall on shallow ground water and the anticipated lack of similar potential effects of the alt 5 wall.	The main reason for eliminating alternative 2 was the lakeside location of the cutoff wall, which left the wall susceptible to overtopping during extreme events and erosion during wave attack. Further, the landside toe treatment in this alternative would not provide the desired level of protection. The potential impacts to ground water were also unknown; however, alternative 5 proposes a test cutoff wall only in subreach 1A, whereas alt 2 proposed a cutoff wall for the entire Reach 1. This location was chosen adjacent to the St. Lucie canal because ground water replenishment can occur from the canal to the landward side of the test cutoff wall. The team will monitor potential impacts of the test cutoff wall and analyze data from a regional ground water model prior to implementation of a partially penetrating cutoff wall along all of Reach 1. If impacts are realized from these analyses, then mitigation would occur to offset these impacts.

USGS-2	The second bullet indicates that there is a relatively impermeable barrier at -200 ft. It can be assumed that the intent of this statement is to indicate that this barrier protects the deeper Floridan aquifer, which serves as the primary source of public water supply in the region.	Do not concur. The purpose of that statement is to indicate that with a partially penetrating cutoff wall (in this case, -20 to -30 ft tip elevation) groundwater and seepage will still flow under the wall as shown in Figure 2-2 of the EA. In order to completely "cutoff" groundwater flow the cutoff wall would have to extend to the impermeable barrier depth (-200 ft elevation). Since, the cutoff wall does not extend to -200 ft elevation, shallow groundwater flow will still occur. We will clarify the intent of the statement on page 26 of the EA.
Florida Department of Environmental Protection (FDEP)-1	Include the De minimus exemption (DEP File No. 0234604-002) in Section 1.8 that may be used for constructing the seepage cutoff wall in Reach 1D.	Concur. The De minimus exemption (DEP File No. 0234604-002) has been added to Section 1.8.
FDEP-2	Figure 2-3 does not depict the current designs for the typical cross-sections of the partial and full seepage berm. The Corps should update this figure with the latest design.	Concur. The updated design for the seepage berm has been included in the EA.
FDEP-3	The Affected Environment Section 3, paragraph 3.5 (Recreation) fails to mention the segment of the Lake Okeechobee Scenic Trail (LOST) located in Reach 1 of the dike. Clarify the statement that the "haul road" will be "PAVED" where the haul road is referenced in relation to the LOST on page 28, 4.1.5 and page 34, item 2.	<p>Concur. The LOST will be discussed under Recreation, Section 3.6 of the EA.</p> <ol style="list-style-type: none"> 1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail. 2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation. 3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.

FDEP-4	Section 4.10 should also mention protective measures for the wood stork, snail kite, and crested caracara.	Protective measures for the listed species have been added to Section 4.10, item 6, pg 48 of the EA.
Florida Department of Transportation (FDOT) -1	Label all the adjoining roadway and railroad facilities on the individual maps provided in Appendix C.	Adjacent railroad and main roads have been identified in the Maps in Appendix C.
FDOT-2	Section 4, Environmental Components-Land Use Transportation does not further discuss impacts to transportation features which may be impacted by the filing of the drainage swale in the preferred alternative.	The preferred alternative does include a drainage swale in the actual design of the partial seepage berm and therefore there are no anticipated impacts to adjacent roads and railroads from rainfall and surface water flows.
FDOT-3	FDOT requests that all related impacts to LOST be completely documented in the related NEPA report with information as to how they will be fully mitigated to its current condition. Any temporary trail closure during the rehabilitation should be accompanied with appropriate signing and public notices.	<p>In Reaches 1A and 1B the LOST is unpaved. In these sections the LOST will be restored consistent with Army O&M requirements.</p> <p>At this time cutoff wall construction will occur only in Reach 1A. Therefore the LOST will not be affected in Reaches 1B, 1C and 1D at this time.</p> <p>In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:</p> <ol style="list-style-type: none"> 1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize impacts to the Lake Okeechobee Scenic Trail. 2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation. 3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds. <p>Concur, any temporary trail closure during the</p>

		rehabilitation will be accompanied with appropriate signing and public notices.
Roswell Harrington (RH)-1	Page vii Para g. There is no consistency to the elevations of the varying 'soils' (muck is not considered soil but rather varying types of humus) around the lake. For example the depths of the 'muck' can vary between -6 to -11 feet sea level.	It is true that the thicknesses of all remaining deposits of organic soils are highly variable, not only beneath HHD, but within the south by the Okeechobee Ridge and Water Conservation Areas, and to the west by the Caloosahatchee River. The subsurface geological profiles have been extensively studied and were taken into consideration during the design of the partially penetrating cutoff wall depth. This is why the cutoff wall depth varies.
RH-2	Page vii Para i. and Table 4-1, page 35, Historical Properties. There are both anecdotal references to and proven and located sites of Calusa, Seminole Indian and early military sites all along the shore line of Lake Okeechobee. This also includes the locations of numerous 'lost' rivers which are important to understanding both the history and the underlying geology of the area.	A historical determination has already been coordinated with the State Historic Preservation Officer. Work discussed in this EA will occur only in the current HHD footprint.
RH-3	Page x Second Para, Last sentence How will you mitigate the lost of 'muck' soils? I asked a soil specialist and he told me that the only way to mitigate this would be plant indigenous and native plants and flood the land to be mitigated for a thousand years.	Mitigation will not be necessary because the work being done is within the existing right-of-way and muck removal in this area will be insignificant.
RH-4	Page 3 Para 1.3 Soils and piping into the sand layer are necessary to the protection of the deep 'muck' (Torry Island, Terra Ceia and Poker series) soils located along the eastern edge of the Lake Okeechobee Ridge, which exist throughout Reach 1a though 1d	With the partially penetrating cutoff wall ground water will still flow through to the Okeechobee Ridge. The purpose of the cutoff wall is to cutoff piping in the vicinity of the dike; however seepage will continue to flow beyond the dike, please see Figure 2-2. Also, The partially penetrating test cutoff wall is only located in Reach 1A. The Corps anticipates that there will be no effects on ground water based on the following:

		<p>1. The partially penetrating test cutoff wall tip extends to elevation -20 ft for the majority of Reach 1A, with some portions extending to elevation -30 ft. In order to cutoff groundwater flow completely, the wall would have to extend down to the confining layer (the Hawthorne formation) which is at an elevation of approximately -200 ft. Since the partially penetrating cutoff wall depth does not extend to -200 ft elevation, groundwater will flow underneath the wall and return up to the shallower depths. See Figure 2-2.</p> <p>2. The partially penetrating cutoff wall is located in Subreach 1A. This location was identified because of the proximity to the St. Lucie Canal. Groundwater replenishment can occur from the canal to the landward side of the cutoff wall.</p>
RH-5	<p>Page 6 Para 1.7</p> <p>In an area full of unique soil 'muck' types and farming practices, why was there not any consultation with the USDA and NRCS?</p>	<p>The EA was sent to both the USDA and NRCS for review; they did not provide any comments. Since the preferred alternative evaluated in this EA is within the Corps existing right-of-way, the project will have insignificant impacts on muck soils, and have no impacts on farmlands.</p>
RH-6	<p>Page 9 Para 2.1.2</p> <p>Possibly the most irritating comment in this in this document is the comparison of the area to the New Orleans Levees and Hurricane Katrina. The geology, the geography in fact the history of storms that have attacked this area is totally different than the New Orleans' area. We have been hit more often by more severe storms than New Orleans and other than in 1926 and 1928 the dike in all its incarnations has not failed.</p>	<p>The document intent was not to compare the Herbert Hoover Dike to the New Orleans' levees. Instead, the intent was to explain that the Corps design standards were altered after the tragedy of the New Orleans levee failures. The USACE reevaluated design criteria so that resiliency and redundancy would be incorporated into designs to produce more robust end products.</p> <p>At lake elevations within the regulation schedule, there are numerous occurrences of piping distresses that occur with regular frequency. However, the real danger will occur at higher lake elevations approaching the 100-year flood level and higher. The 100-yr flood can be defined as the lake event which will be equaled or exceeded, on average, once every 100 years, and for lake Okeechobee corresponds to an elevation of about 21.3 ft-NGVD. It does not matter that the lake has never seen this elevation in recorded history, the probability nonetheless exists. While seepage is a natural process that occurs through all soils downstream of a dike, levee, or dam, the problem occurs when this seeping</p>

		water makes its way to ground surface and begins to transport soil particles. If undetected and left to chance, this erosion could persist and work its way back to the lake at which point an underground pipe would exist to allow the lake water to flow through faster, eroding more soils, and eventually resulting in a breach of HHD and uncontrolled loss of lake waters which would inundate hundreds of square miles of land for many months.
RH-7	<p>Page 17 Figure 2-7</p> <p>Minor comment- the poles have been off the dike for over 6 months.</p>	Acknowledged. This drawing predates the power line and pole removals.
RH-8	<p>Pages 19 & 20 Para 3.3 Sentence beginning: 'The Principal source.....'</p> <p>The primary source of ground water of the area located with in the first several hundred yards next to the Dike is seepage under the Dike and the Lake Okeechobee Ridge. This is especially important as the elevation of the lands close to the Ridge is quite a bit higher than those away from the Ridge and farther east.</p>	Noted.
RH-9	<p>Page 21 Para 3.5 First Paragraph</p> <p>You did not mentioned anything in the Area around Canal Point, The correct name for the park on the Lake front is 'Canal Point Lion's Club Park' At this site and up and down the Palm Beach Canal for a 1/4 mile is used year round by fishermen and boating.</p>	Concur. We will mention this recreational area in Section 3.6 – Recreation, page 23 of the EA.
RH-10	<p>Page 21 Section 3.5, Second Para</p> <p>There have only been a couple of biking events on the top of the Dike. Every year there is a biking event on the highways next to the Dike. The local chapter of the Florida Trails has a yearly event</p>	Noted.

	around Thanksgiving.	
RH-11	<p>Page 21 Para 3.6</p> <p>There are 7 not 5 access points to the Lake in the area under discussion.</p> <p>Going from North to South</p> <ol style="list-style-type: none"> 1. Port Mayaca 2. Canal Point Lions Club Park 3. East Beach Road 4. Pahokee Marina 5. Jones Pump House 6. Rardin Park 7. Belle Glade Marina <p>There is another access where the barge loading platform was located.</p>	<p>Concur. The seven named access points will be mentioned in the EA, Section 3.8 – Aesthetics, page 24.</p>
RH-12	<p>Pages 26 and Table 4-1 on p 33</p> <p>There is a population of Florida Tree Snails that was introduced to the area in the late 40's by my father. They exist along the Lake Okeechobee Ridge from the area know as Sand Cut to into Pahokee.</p>	<p>Thank you for informing us. The preferred alternative will not disturb the natural habitat of the tree snails because the partial seepage berm will only be implemented within the Corps existing right-of-way. There where no natural habitat (such as wild tamarind, pigeon plum, myrsine and bustic) for the tree snail observed in this area. We will include them under the state listed species section of the EA.</p>
RH-13	<p>Page 28 Para 4.1.3 – Water Resources, Alternative No. 5 paragraph</p> <p>As I stated previously, How do you know this? Nowhere in this report is there any reference to any individual that has any knowledge of the 'muck' soils or of the farming practices of the area.</p>	<p>With the partially penetrating cutoff wall ground water will still flow through to the Okeechobee Ridge, the purpose of the cutoff wall is to cutoff piping in the vicinity of the dike, however seepage will continue to flow beyond the dike, please see Figure 2-2. Also, The partially penetrating test cutoff wall is only located in Reach 1A.</p> <p>The Corps anticipates that there will be no effects on ground water based on the following:</p> <ol style="list-style-type: none"> 1. The partially penetrating test cutoff wall tip extends to elevation -20 ft for the majority of Reach 1A, with some portions extending to

		<p>elevation -30 ft. In order to cutoff groundwater flow completely, the wall would have to extend down to the confining layer (the Hawthorne formation) which is at an elevation of approximately -200 ft. Since the partially penetrating cutoff wall depth does not extend to -200 ft elevation, groundwater will flow underneath the wall and return up to the shallower depths. See Figure 2-2.</p> <p>2. The partially penetrating cutoff wall is located in Subreach 1A. This location was identified because of the proximity to the St. Lucie Canal. Groundwater replenishment can occur from the canal to the landward side of the cutoff wall.</p>
RH-14	<p>Page 29 Para 4.1.3 Last para.</p> <p>How will mitigate oxidation of the 'muck' soils?</p>	<p>The SFWMD, NRCS, and USGS have all documented in various reports the loss of organic soils (covering the spectrum of peats and silts) over the past 70 years - predating construction of HHD and having nothing to do with HHD. These report findings have been taken into consideration during the design process, as well as the combined interpretations of several professional geologists. The primary cause of oxidation of organic soils is over drainage as with agricultural practices and construction of the major drainage canals in the early 1900's dug by Hamilton Disston, not the USACE. Agricultural practices are to blame for the 3-9 feet loss of organic soils over the years, and is partly the reason for stability problems with HHD.</p>
RH-15	<p>Page 29 Para 4.1.4 Alternative 5 first para</p> <p>Have you contacted the Palm Beach County Historical Resources Review Board, the Palm Beach Historical Society, the Palm Beach County Archaeologist?</p>	<p>Mr. Chris Davenport, WPB Archaeologist, will be contacted.</p>
RH-16	<p>Page 30 Para 4.1.6 Recreational Resources Alternative 5 para 3. Also Table 4-1, Recreation, pg 46</p> <p>I have been involved in local eco-tourism efforts and the development of the Lake Okeechobee Scenic Trail for the last twenty years. I would like to know that effort of me and many others was not for nothing. I find</p>	<p>In Reaches 1A and 1B the LOST is unpaved. In these sections the LOST will be restored consistent with Army O&M requirements.</p> <p>In Reaches 1C and 1D the LOST is paved. For these sections the Corps will do the following:</p> <p>1. The Corps will continue, consistent with its authority and funding, through design refinement to seek to reduce and minimize</p>

	<p>'will explore' and 'to determine if it is appropriate' infuriating at best.</p>	<p>impacts to the Lake Okeechobee Scenic Trail.</p> <p>2. As necessary for construction of the Herbert Hoover Dike improvements, the Corps will require its construction contractors to maintain a haul road during construction. Said haul road will not be removed but will be left in place after construction and can be used as a trail when not being used for maintenance, repair or rehabilitation.</p> <p>3. The Corps will explore utilization of Section 111 authority of the 1958 River and Harbor Act, Public Law 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the Lake Okeechobee Scenic Trail out of project funds.</p> <p>However, the USACE gave permission for LOST to be built with the caveat that it might be subject to future reconstruction efforts on the Dike itself. The USACE cannot commit to repair something that was not authorized as part of the Federal project; however we are exploring point #3.</p>
RH-17	<p>Page 35 Socio Economics</p> <p>No mention of Loss of Land (oxidation) homes and the stress caused by the way this entire issue has been handled.</p> <p>Plus the damage that the lack of firm information is doing to any attempts to develop the potential of the area.</p>	<p>This EA evaluated impacts anticipated with implementation of the proposed project. Since the preferred alternative being evaluated in this EA will be implemented within the Corps existing right-of-way, there will be no land acquisition required for this project.</p> <p>The Corps will continue to coordinate future design with public, private and agency stakeholders through future NEPA documentation. A Corporate Communication Office (CCO) is established in the project area to provide the community with the most up to date information on the project as it comes available.</p>
RH-18	<p>Page 35 Public Health and Safety</p> <p>The damage of a 'possible' breach of the dike as compared to the daily stress caused by lack of knowledge and the real threat or loss of homes, land and jobs. This stress is a long term and recognized issue that has grown out of any governmental involvement in the lives of Glades</p>	<p>Noted. Since the preferred alternative being evaluated in this EA will be implemented within the Corps existing right-of-way, there will be no land acquisition for this project.</p> <p>The Corps will continue to coordinate future design with public, private and agency stakeholders through future NEPA documentation. A Corporate Communication Office (CCO) is established in the project area</p>

	<p>residents. No one agency is solely responsible for this extremely defensive attitude, but it does exist. I refer you to a recent document that shares some common ground with your current report. Although this document points to racial attitudes as part of the problem, speaking as a life long resident it is more of an attitude, 'It is us (Glades Residents) against them (outsiders).</p>	<p>to provide the community with the most up to date information on the project as it comes available.</p>
RH-19	<p>Page 44 Para 4.5 Topography, Geology and Soils</p> <p>I strongly disagree. How can you say this when you do not know. You have indicated your lack of certainty in this issue is this report.</p>	<p>Do not concur. The topography, geology and soils of the project area have been extensively studied by our geologists and geotechnical engineers.</p>
RH-20	<p>Page 44 Para 4.5 Water Resources</p> <p>I strongly disagree. How can you say this when you do not know. You have indicated your lack of certainty in this issue is this report.</p>	<p>Do not concur. The hydrology of the project area environment has been studied. The USACE is currently conducting regional groundwater modeling. If the model results indicate that there is an impact to water supply through changes in groundwater recharge, the deficit can be offset with adjustments to system operations.</p>
RH-21	<p>Page 51 Para 4.11.8 Farmland Protection Policy Act</p> <p>You have already stated that you do not know what will happen when you cut off the ground water to the 'muck' soils next to the Lake Okeechobee Ridge. The 'muck' is unique. The micro climate that exists along the eastern shore of the Lake is unique.</p>	<p>In essence, the problem is the groundwater and its uncontrolled rise to the ground surface. The solution is rather complicated. Most of the underground flow is conducted through the underlying sands and limestone layers. This aquifer is about 200 feet thick. Simply put, we are trying to push the groundwater deeper and farther away from the base of HHD. Conceptually, this can be accomplished with a cutoff wall and seepage berm. The cutoff wall may be a bit of a misnomer as it does not truly cut off groundwater flow. Think of it as a barrier. The cutoff wall, or barrier, will extend to a depth below bottom of limestone, leaving over 150 feet of aquifer beneath for groundwater to flow. Because the underlying aquifer is so vast (like an underground river), the shallow cutoff wall in Reach 1A will not disturb the aquifer flow - however, the cutoff wall will only affect the groundwater immediately beneath HHD and the extent of the seepage berm, in this case within the project right-of-way. A full-scale, regional groundwater model is being built to</p>

		assess/estimate any impacts for the full implementation of the 50-mile long cutoff wall (reaches 1, 2, and 3). Regional groundwater flow around, through, and beneath Lake Okeechobee, and HHD, can be influenced not only by lake and canal elevations, but rainfall north of the lake and runoff from the Okeechobee ridge to the east and the Pineland ridge to the west.
RH-22	<p>Page 5 – List of Reviewers</p> <p>Why was this document not reviewed by anyone familiar with the geology, soils and farming practices that exist around the Lake?</p>	<p>The document was reviewed by a geotechnical engineer and a hydrological engineer. They are very familiar with the subsurface geology and hydrology of the HHD their names have been added to the List of Reviewers.</p>

REFERENCES

Herbert Hoover Dike, Major Rehabilitation Evaluation Report, dated November 2000.

Herbert Hoover Dike, Major Rehabilitation Evaluation Report, Reach 1, Draft and Final Environmental Impact Statement, March and July 2005.

Herbert Hoover Dike, Major Rehabilitation Evaluation Report, Reaches 2 and 3, Draft Environmental Impact Statement, December 2006.

Herbert Hoover Dike, Major Rehabilitation Evaluation Report, Reach 1, Environmental Assessment, January 2007.

Performance Evaluation of the New Orleans and Southwest Louisiana Hurricane Protection System, Draft Final Report of the Interagency Performance Evaluation Task Force (IPET), June 1, 2006.

Report of Expert Review Panel, Technical Evaluation of Herbert Hoover Dike Lake Okeechobee, Florida prepared by BCI Engineers & Scientists, Inc.

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APPENDIX A

404(b) EVALUATION

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SECTION 404(b) EVALUATION

HERBERT HOOVER DIKE MAJOR REHABILITATION PARTIAL SEEPAGE BERM IN REACH 1 AND TEST CUTOFF WALL IN REACH 1A MARTIN AND PALM BEACH COUNTIES

I. Project Description

a. Location. The existing HHD system is approximately 143 miles (230 km) long, and comprises five counties: Glades, Hendry, Martin, Okeechobee, and Palm Beach. It is divided into eight segments or “Reaches” for planning purposes. The southeastern segment, Reach 1, is the focus of the present study. Reach 1 is an approximately 22.4 miles (36 km) long segment of the HHD located along the southeast portion of the lake. This segment extends from the St. Lucie Canal at Port Mayaca, south to the Hillsboro Canal at Belle Glade (see Figure 1-1 of the EA).

b. General Description. The recommended plan for rehabilitation of Herbert Hoover Dike (HHD) consists of an integrated solution that addresses internal erosion, slope stability and foundation vulnerabilities. This integrated solution includes two main features: a seepage berm and a partially-penetrating cutoff wall. The full seepage berm will extend from the landside toe of the embankment out to varying distances ranging from about 25-feet minimum to about 175-feet maximum. The width of the seepage berm beyond the right-of-way (ROW) has not been finalized yet. When a full project footprint is available it will be coordinated with stakeholders and affected parties. Prior to constructing the remainder of the project the Corps must have modeling and other technical information. Any work outside the existing ROW will be addressed in future NEPA documentation. The seepage berm thickness will be about 6-8 feet and it will be constructed with predominantly sands and gravels, except that it will include transition layers at the contact with the existing embankment to satisfy filter design criteria. A drainage swale would also be constructed along the landward toe of the berm to collect and convey surface drainage from each side of the seepage berm. Where a toe ditch is present, it will be filled and covered by construction of the seepage berm. Where a C&SF drainage canal exists, its functionality will not be negatively impacted. The seepage berm is relatively easy to construct, and it can be implemented immediately in the most critical areas of the dike where adequate space is available. The impervious, partially-penetrating cutoff wall will extend from below the centerline of the embankment to 5-10ft below the limestone layers. The limestone exists at varying depths along the HHD alignment and is highly transmissive and is one of the main reasons for the seepage flows at the toe of the embankment.

c. Authority and Purpose. The Flood Control Act (Act), approved by Congress on 30 June 1948, authorized the first phase of a comprehensive plan to provide flood protection and other water control benefits in central and south Florida. The Act included measures for improving control of Lake Okeechobee by constructing or modifying the spillways and other structures, and enlarging the Lake Okeechobee levees to provide the intended flood protection, water storage and water supply. Levee seepage and stability have a direct effect on the capability

of the levee to provide the authorized protection. The authorization for levee repairs and modifications of the Flood Control Act of 1948 justify the proposed renovation to the HHD.

The general goal of the HHD MRR is to provide a reliable embankment system around Lake Okeechobee to contain the lake waters for flood protection, water supply, and navigation. An unreliable embankment system, such as that which currently exists along the HHD, could allow for a failure of the system to contain lake waters. Such a failure could result in loss of life, property, and habitat. A reasonable and effective rehabilitative effort is required to eliminate this possibility.

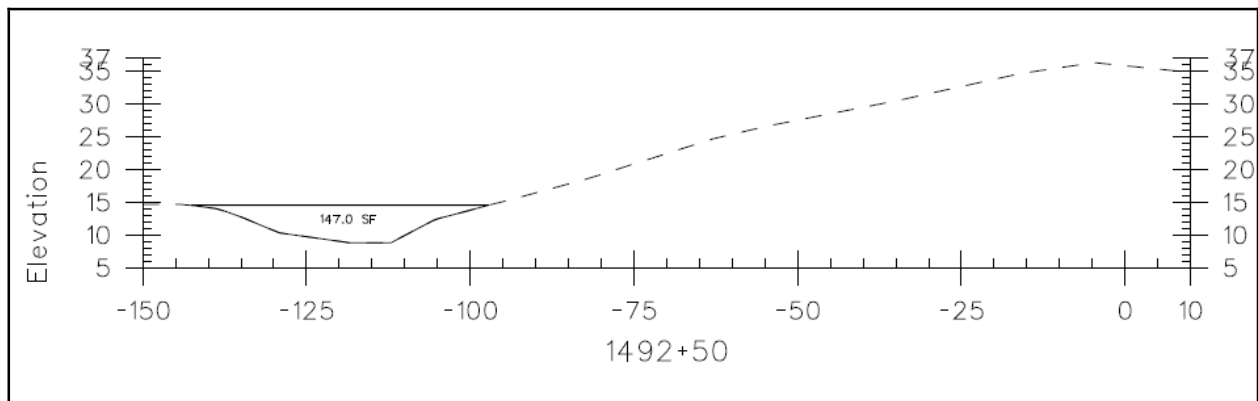
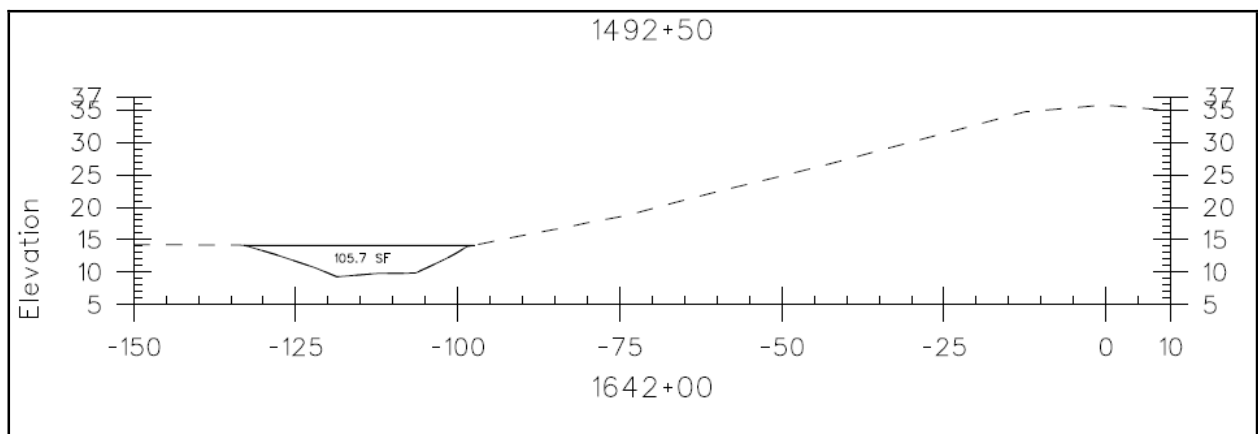
d. General Description of Dredged or Fill Material.

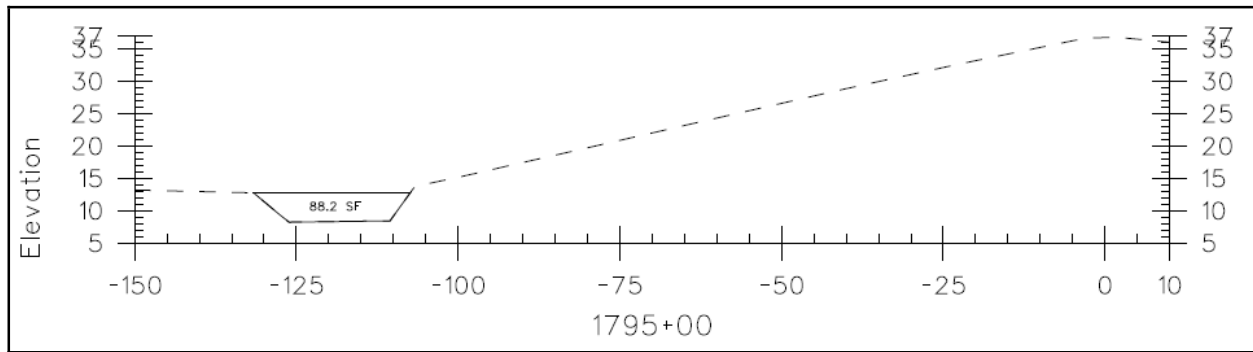
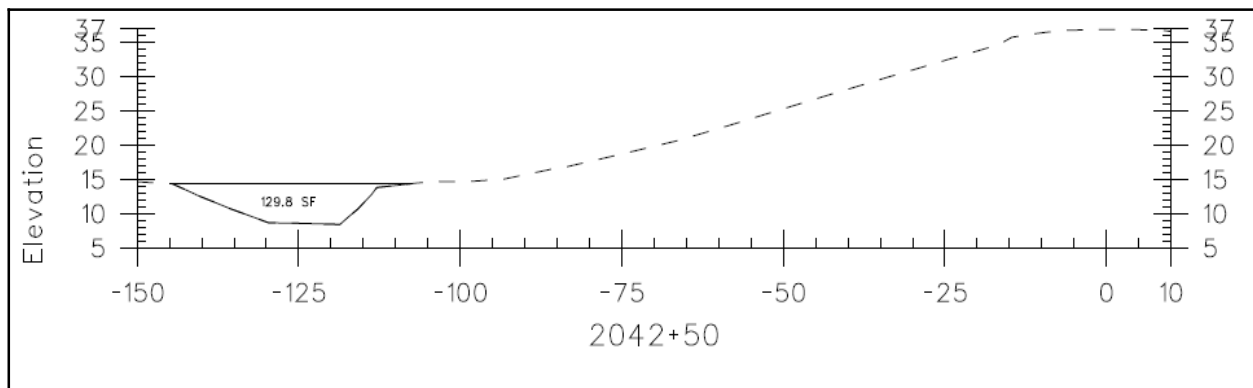
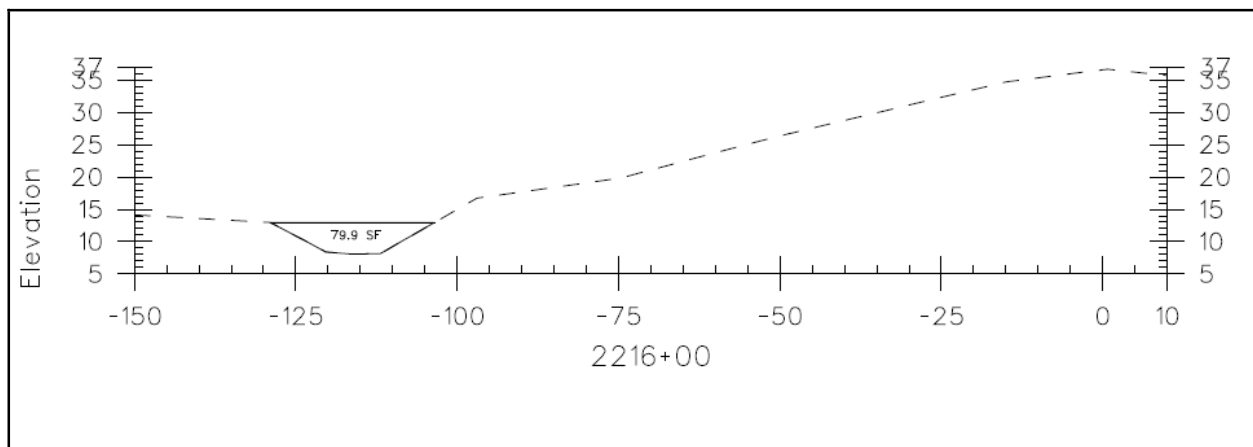
(1) General Characteristics of Material. Material from the levee will need to be excavated prior to installation of the cutoff wall and seepage berm. This material is composed primarily of fill material for the HHD from the excavation of lake rim canal and contains a mixture of sand, silts and clays with varying content of organic materials. The proposed seepage berm will be composed of select granular materials, primarily limestone or quartz, gravel and sand sized particles. The material of the cutoff wall will be determined during the detailed design after the preparation of the plans and specifications.

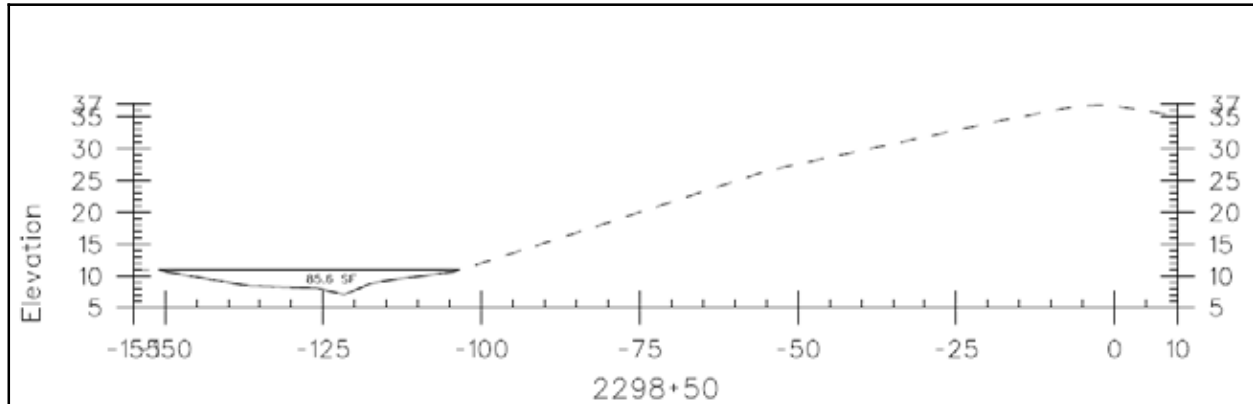
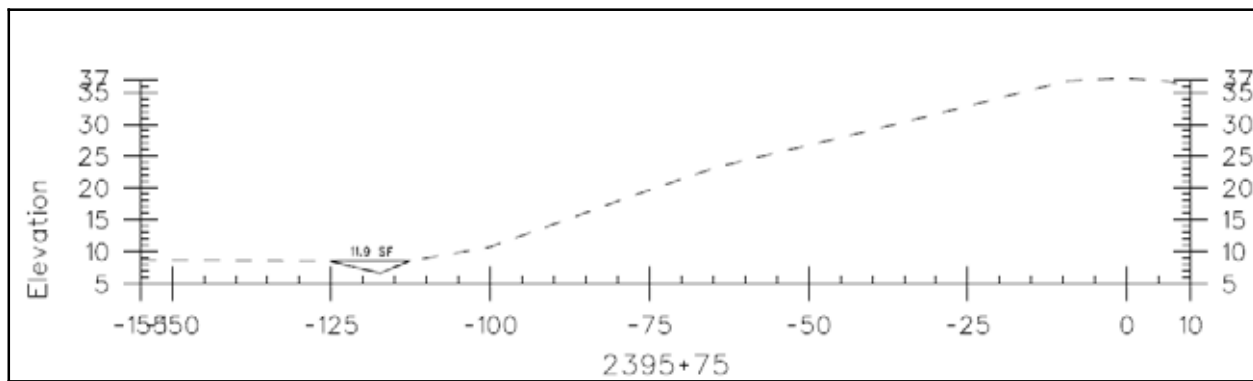
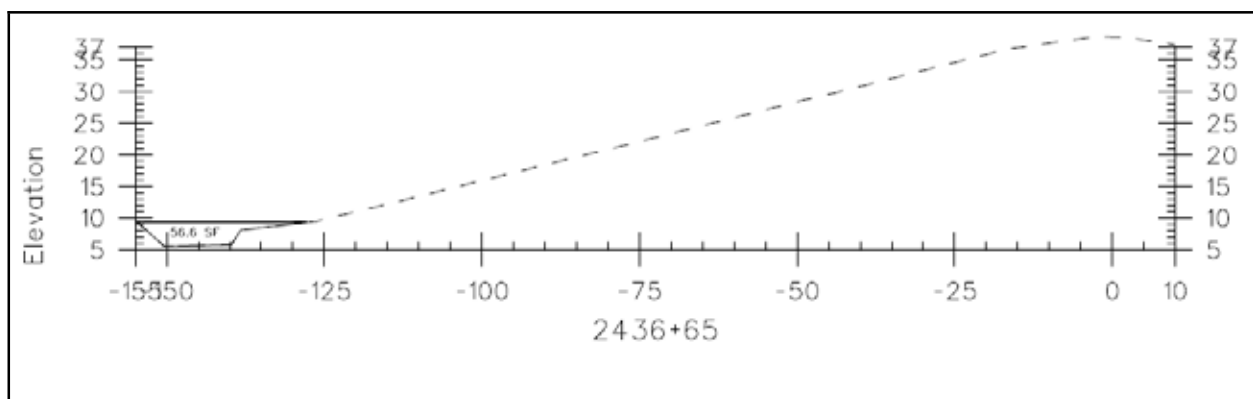
(2) Quantity of Material. Implementation of the preferred alternative would require backfilling 40.5 acres of toe ditch and adjacent wetlands within the existing ROW, resulting in an estimated volume of 421,652 cubic yards of material to be backfilled into the Reach 1 landward wetlands within the existing ROW. See Table A-1 for fill volume calculations. Figures A-1 through A-8 represent eight typical cross sections that were used to estimate the volume of fill.

TABLE A-0-1: ESTIMATED VOLUME OF FILL FOR REACH 1

BEGINNING STATION	ENDING STATION	LENGTH FT	STATION NUMBER	AREA FT ²	VOLUME FT ³	VOLUME YD ³
139000	159500	20500	1492+50	147	3013500	111611.11
159500	169000	9500	1642+00	105.7	1004150	37190.741
169000	190000	21000	1795+00	88.2	1852200	68600
190000	218500	28500	2042+50	129.8	3699300	137011.11
218500	224700	6200	2216+00	79.9	495380	18347.407
224700	235000	10300	2298+50	85.6	881680	32654.815
239300	239850	550	2395+75	11.9	6545	242.40741
239850	247480	7630	2436+65	56.6	431858	15994.741
TOTALS		104180				421652.3
NOTES: Volume of fill for EA represents a rough order of magnitude estimate. Cross sections were taken from survey 01-224 that was converted to NAD 83 NAVD 88.						

**FIGURE A-1: CROSS SECTION 1****FIGURE A-2: CROSS SECTION 2**

**FIGURE A-3: CROSS SECTION 3****FIGURE A-4: CROSS SECTION 4****FIGURE A-5: CROSS SECTION 5**

**FIGURE A-6: CROSS SECTION 6****FIGURE A-7: CROSS SECTION 7****FIGURE A-8: CROSS SECTION 8**

(3) Source of Material. No definitive source of borrow material has been identified. A commercially licensed source of quarry material that produces ASPM standard gradations will be identified.

e. Description of the Proposed Discharge Site.

(1) Location. See **Figure 1-1** of the EA.

(2) Size. The priority discharge sites total an approximate 104,180 linear feet of wetlands landward of the dike within the existing ROW.

(3) Type of Site. The project site is an upland embankment composed primarily of fill material and vegetated by mixed grasses. The embankment toe is bordered by a toe ditch throughout most of Reach 1. The toe ditch contains mostly invasive or exotic vegetation, but provides wetland habitat. Agricultural fields, residential developments, and an airport are adjacent to the HHD.

(4) Type of Habitat. The habitat consists of upland grasslands, invasive brush, inundated toe ditches, and residential back yard areas.

(5) Timing and Duration of Dredging. No dredging is specified for this work.

f. Description of Disposal Method. Disposal method will be determined as necessary for construction of each project element.

II. Factual Determinations

a. Physical Substrate Determinations (consider items in sections 230.11(a) and 230.20 Substrate)

(1) Substrate Elevation and Slope. At the conceptual level the test cutoff wall will be excavated to 5-10ft below the limestone layer. The HHD landward toe ranges in elevation from 12 to 14 feet NGVD of 1929. The fill areas are at the base of the back toe of the landward side of the dike. Specific information regarding topography may be found in Section 3.03 of the FEIS.

(2) Type of Fill Material. The proposed fill for seepage berm will be composed of select granular materials primarily limestone or quartz, gravel and sand sized particles. Cutoff wall material will be decided during detailed plans and specifications.

(3) Dredged/Fill Material Movement. The fill material will be stabilized and should not be subject to erosion.

(4) Physical Effects on Benthos. Benthic organisms may be temporarily displaced during construction activities.

b. Water Circulation. Fluctuation and Salinity Determinations

(1) Water Column Effects. Standing water and soils periodically inundated will be temporarily impacted during construction. Turbidity and erosion will be controlled during and post-construction.

(2) Current Patterns and Circulation. Construction of the seepage berm at the toe ditches should have minimal effect on current hydrologic circulation patterns. Construction of the test cutoff wall will have an impact to hydrological patterns within the HHD footprint. Seepage will flow between the bottom edge of the wall and the impervious layer. The underseepage will then be collected in a swale.

(3) Normal Water Level Fluctuations and Salinity Gradients. Surface and ground water levels will not be affected. Salinity levels should not be affected by the proposed project.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. There may be a temporary increase in turbidity levels in the project area during discharge. Turbidity will be short-term and localized and no significant adverse impacts are expected. State standards for turbidity will not be exceeded.

(2) Effects on the Chemical and Physical Properties of the Water Column. There may be temporary impacts to the chemical and physical properties of nearby waters during construction activities. There are no acute or chronic chemical impacts anticipated as a result of construction. An environmental protection plan, prepared during detailed design, will address concerns regarding monitoring of equipment, maintenance and security of fuels, lubricants etc.

(a) Light Penetration. Some decrease in light penetration may occur in the immediate vicinity of the construction area. This effect will be temporary, limited to the immediate area of construction, and will have no adverse impact on the environment.

(b) Dissolved Oxygen. Dissolved oxygen levels will not be altered by this project.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens are expected to be released by the project.

(d) Aesthetics. The aesthetic quality of the water in the immediate area of the project may be temporarily affected by turbidity during construction. This will be a short-term and localized condition.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. Fill will replace approximately 22 miles of HHD toe vegetated by land grasses. An access road will be built on top of berm, eliminating their primary productivity. Primary production within the lake outflows should not be affected.

(b) Suspension/Filter Feeders. An increase in turbidity in the toe ditch could adversely impact burrowing invertebrate filter feeders within and adjacent to the immediate construction area. It is not expected that a short-term, temporary increase in turbidity will have any long-term negative impact on these highly fecund organisms.

(c) Sight Feeders. No significant impacts on these organisms are expected as the majority of sight feeders are highly motile and can move outside the project area.

d. Contaminant Determinations. Material which will be dredged from the proposed borrow site will not introduce, relocate, or increase contaminants at the fill area.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. No adverse impacts on autotrophic or heterotrophic organisms are anticipated.

(2) Effects on Benthos. No adverse impacts benthic organisms are anticipated.

(3) Effects on Nekton. Mostly small forage fish may be temporarily displaced by construction and turbid water. However, no long-term adverse impacts on nekton are anticipated.

(4) Effects on the Aquatic Food Web. No adverse impacts on aquatic organisms is anticipated. There is expected to be a relatively minor temporary effect on the aquatic food web due to construction activities. Wetlands at toe ditch and lake should maintain their functional value.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. There are no hardground or coral reef communities located within the proposed project site.

(6) Endangered and Threatened Species. There will be no significant adverse impacts on any threatened or endangered species or on critical habitat of any threatened or endangered species. Refer to Section 4.10 Environmental Commitments of this EA for measures that will be implemented to protect endangered and threatened species.

(7) Other Wildlife. No adverse impacts to small foraging mammals, reptiles, or wading birds, or wildlife in general are expected.

(8) Actions to Minimize Impacts. All practical safeguards will be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area. Specific precautions are discussed in the in the Draft EA under Environmental Commitments.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. The dredged material will not cause unacceptable changes in the mixing zone water quality requirements as specified by the State of Florida's Water Quality Certification permit procedures. No adverse impacts related to depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents are expected from implementation of the project.

(2) Determination of Compliance with Applicable Water Quality Standards. Because of the inert nature of the material to be used as fill, Class III water quality standards will not be violated.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. No municipal or private water supplies will be impacted by the implementation of the project.

(b) Recreational and Commercial Fisheries. Recreational and commercial fisheries should not be impacted by the implementation of the project.

(c) Water Related Recreation. Water related recreation in the immediate vicinity of construction will likely be impacted during construction activities. This will be a short-term impact.

(d) Aesthetics. The existing environmental setting may be adversely impacted, particularly at parks and other natural settings. Construction activities will cause a temporary increase in noise and air pollution caused by equipment as well as some temporary increase in turbidity. Some vegetation buffering natural areas or parks may be unavoidably removed during construction. These impacts are not expected to adversely affect the aesthetic resources over the long term and once construction ends, conditions will return to pre-project levels. Trees removed would be replaced.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. State and local parks do exist within the proposed project area and would be temporarily impacted by construction activities as described in (d) above. In addition, certain stretches of the LOST may be damaged or removed by

construction activities. These impacts would be minimized and avoided as practicable.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. There will be no cumulative impacts that result in a major impairment of water quality of the existing aquatic ecosystem as a result of the placement of fill at the project site.

h. Determination of Secondary Effects on the Aquatic Ecosystem. There will be no secondary impacts on the aquatic ecosystem as a result of the construction.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.

c. The discharge of fill materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The placement of fill materials for implementation of the proposed project will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

e. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. Appropriate steps have been taken to minimize the adverse environmental impact of the proposed action. Turbidity will be monitored so that if levels exceed State water quality standards, the contractor will be required to cease work until conditions return to normal.

g. On the basis of the guidelines, the proposed disposal of dredged material and fill of wetlands are specified as complying with the requirements of these guidelines.

APPENDIX B

CZMP EVALUATION

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**FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES**

**HERBERT HOOVER DIKE MAJOR REHABILITATION
REACH 1**

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed work project is not seaward of the mean high water line and would not affect shorelines or shoreline processes.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan which sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed work has been coordinated with the State without objection.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project purpose is to strengthen and protect the existing lake levee system, thereby ensuring adequate flood control for residents of the region. No action may result in conditions which enhance the possibility of a project failure, resulting in an emergency situation and potentially causing significant damage to persons and property. Therefore, this work would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed project is the least destructive to the aforementioned resources of all the action alternatives considered. The existing habitat within the project area is of marginal quality and has largely been developed for agriculture, urban and residential uses. Impacts to wetlands are expected to be mitigated in the area.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: At this time it is not known what lands may need to be purchased for completion of the proposed project. Initial indications are that most lands are already within the HHD levee right of way and are therefore in Federal ownership. Any lands that will need to be acquired will be covered under a future EIS when details for those plans are available.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed work may affect Pahokee State Park arboreal resources with removal for construction access (Section 5, pg FEIS-57). Municipal and county parks may be temporarily affected, however these areas would be returned to their pre-construction condition following completion of the project. Portions of the LOST may be impacted or removed from the dike levee. Impacts will be avoided and minimized to the extent practicable throughout construction activities.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). SHPO consultation on Reach 1 was initiated August 20, 1999. In April 7 2005, response, the SHPO concurred with the Corps' no adverse effect determination on Reach 1. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. Consultation for Reaches 2 and 3 is ongoing. The project is in compliance with each of these Federal laws. Historic preservation compliance will be completed to meet all responsibilities under Chapter 267.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: Contribution from the study area to the State's tourism economy would not be compromised by project implementation. Temporary, short-term impacts may be realized during construction due to effects to municipal and county parks and bank fishing areas. These effects are not expected to be significant. The project would be compatible with tourism for this area and could potentially contribute to overall growth and development of the area therefore, would be consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: The proposed project would not impact the existing public transportation system of the area and therefore, would be consistent with the goals of this chapter.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed HHD Major Rehabilitation project is located completely inland and would have no affect on saltwater resources either directly or indirectly through discharge downstream. The proposed project is therefore not applicable to chapter 370.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The proposed project has been coordinated with the Florida Game and Fresh Water Fish Commission (GFC) without objection. In a letter dated November 12, 1998, the GFC concurred with findings and recommendations of the U.S. Fish and Wildlife Service for fish and wildlife protection as outlined in the draft CAR (see Annex A). The Corps has agreed to comply with these recommendations as outlined in Section 5.00 of the EIS. Therefore, the work would comply with the goals of this chapter.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: The proposed project does not involve the transportation or discharge of pollutants. Environmental protection measures will be enforced during construction to avoid inadvertent spills or other sources of pollution.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: This work does not involve the transportation or discharging of pollutants. Conditions will be placed in the contract to handle any inadvertent spill of pollutants. Therefore, the project would comply with this Act.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This work does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The work does not involve land development as described by this chapter; therefore, this chapter is not applicable.

16. 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The work would not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: A Draft Environmental Assessment has been prepared and will be reviewed by the appropriate resource agencies including the Department of Environmental Protection.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed work is located near to, but would not be expected to adversely impact agricultural lands. Project implementation would include appropriate erosion control plans and measures to ensure compliance.

APPENDIX C

MITIGATION

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C.1 REACH 1 WETLANDS ASSESSMENT

On March 13, 2007 an interagency team of scientists representing the USACE, USFWS, USEPA, and FDEP used the Uniform Mitigation Assessment Method (UMAM) to assess the quality and value of wetland habitat that would be impacted through implementation of the preferred alternative, specifically areas that would be directly impacted through backfilling of the toe ditch wetlands and adjacent wetlands within the existing ROW with a partial seepage berm (the Florida Administrative Code Chapter 62-345 UMAM is available in Section C.3 of Appendix C). Common vegetation observed in the Reach 1 assessment area were common reed, cypress, Brazilian pepper, cabbage palm, dayflower, elderberry, pennywort, primrose willow, royal palm, southern willow, strangler fig, water lettuce and water hyacinth. Animals observed included American alligator, great egret, great blue heron, snow egret, turkey, and wood stork. Overall, the wetlands in the Reach 1 assessment area are not considered high quality wetlands, although wading birds do forage the area for small fish.

The team divided the Reach 1 assessment area into eleven polygons based on the distinguishing characteristics of each area (see Figures C-1 through C-11). The polygons are named in numerical order according to the subreach location (e.g. subreach A-1 TD, subreach A-2 TD, etc). The wetlands landward of the HHD toe within the existing ROW vary considerable along Reach 1. The highest value wetlands are located in the northern portion of Reach 1; these are polygons A-2 and A-4. These polygons scored highest overall under the categories considered, which were location and the landscape support of the wetlands, water environment, and vegetation structure. The UMAM scoring sheets are available below and include a list of plant and animal species specific to each polygon. Maps of Reach 1 are available in Section C.4.



FIGURE C-1: AREA A-1 TD (US 441 EAST OF HHD)



FIGURE C-2: AREA A-2 TD (LOOKING SOUTH)



FIGURE C-3: AREA A-3 TD (LOOKING NORTH)



FIGURE C-4: AREA A-3 TD (CLOSE UP OF BIRD TRACKS)



FIGURE C-5: AREA A-4 (LOOKING EAST AT TD FROM DIKE)



FIGURE C-6: AREA B-1 TD (90% WATER LETTUCE IN TD)



FIGURE C-7: AREA B-2 TD (NOTICE PROXIMITY OF RAILROAD, ROAD AND RESIDENTIAL PROPERTY)



FIGURE C-8: AREA C-1 TD (NARROWER TD)



FIGURE C-9: AREA C-2 TD (BANANA GROVE ADJACENT TO TD)



FIGURE C-10: AREA C-2 TD (END OF ASSESSMENT AREA LOOKING NORTH)



FIGURE C-11: END OF AREA D-1 TD TO LEFT (PAHOKEE AIRPORT) AND START OF AREA D-2 (AGRICULTURE ADJACENT TO TD)

C.1.1 UMAM Calculations

Table C-1 includes the calculation for functional wetland loss units. This loss will have to be compensated for through mitigation, to create equivalent functional gain units. Implementation of the preferred alternative No 5 will result in 12.8 functional loss (FL) units. Mitigation carried out as described in Section C.2, resulted in 17.1 relative functional gain (RFG) units. The previous EA that was completed in January 2007 included backfilling the toe ditch wetlands in several identified focus areas. See Figure C-12. It was determined that the proposed work would result in 3.8 FL units; this work was compensated for by 3.8 RFG units from the Melaleuca removal, meaning that 13.3 RFG units from the Melaleuca removal are still available and can be applied to this project ($17.1 \text{ RFG units} - 3.8 \text{ FL units} = 13.3 \text{ RFG units}$). Since the work proposed for the preferred plan in this project will result in 12.8 FL units, we can apply the 13.3 RFG units that remain from the Melaleuca removal, this will result in an overall net 0.5 RFG units ($13.3 \text{ RFG} - 12.8 \text{ FL} = 0.5 \text{ RFG units}$). The qualitative and quantitative assessments are listed below with the corresponding assessment area photos.

TABLE C-1: WETLAND FUNCTIONAL LOSS UNITS

Assessment Area Name	Starting Station	Ending Station	Length (feet)	Width of Water / Wetland to be Filled (ft)	Area (acres)	UMAM Score	Wetland Value that will be lost (functional loss units)
A-1 TD	138350	140500	2,150	10	0.5	0.10	0.05
A-2 TD	140500	144500	4,000	40	3.7	0.70	2.57
A-3 TD	144500	148500	4,000	35	3.2	0.46	1.48
A-3 TD	148500	149500	1,000	30	0.7	0.46	0.32
A-3 TD	149500	151500	2,000	30	1.4	0.46	0.63
A-4 TD	151500	159500	8,000	25	4.6	0.60	2.75
B-1 TD	159500	169000	9,500	15	3.27	0.60	1.96
B-1 Pasture	167200	169200	2,000	15	0.7	0.17	0.11
B-2 TD	169000	184000	15,000	25	8.6	0.40	3.44
C-1 TD	184000	190000	6,000	20	2.8	0.37	1.01
C-1 Wetland	184000	190000	6,000	25	3.4	0.20	0.69
C-2 TD	190000	218500	28,500	10	6.5	0.20	1.31
D-1 TD	218500	222000	3,500	6	0.5	0.27	0.13
D-1 TD	222000	224700	2,700	0	0.0	0.00	0.00
D-2 TD	224700	228500	3,800	4	0.3	0.27	0.09
D-3 TD	228500	235500	7,000	2	0.3	0.10	0.03
TOTAL					40.5		16.6
Functional loss units covered in Jan 2007 EA							3.8
NET TOTAL Functional Loss Units for Alt 5							12.8

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name Herbert Hoover Dike		Application Number		Assessment Area Name or Number Reach 1	
FLUCCs code		Further classification (optional)		Impact or Mitigation Site?	Assessment Area Size
Basin/Watershed Name/Number Lake Okeechobee		Affected Waterbody (Class) III drinking water		Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) Federal Navigation	
Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands Seepage connection, along Lake Okeechobee shoreline					
Assessment area description Reach 1, approximately 22.5 miles long, located along the southeast portion of the Lake. Extends from the St.Lucie canal at Port Mayaca, south to the Hillsboro Canal at Belle Glade.					
Significant nearby features Herbert Hoover Dike, LOST, highway, agricultural areas, nurseries, residential.				Uniqueness (considering the relative rarity in relation to the regional landscape.) N/A	
Functions Minimal habitat				Mitigation for previous permit/other historic use N/A	
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) Otter, alligator, turtle, wading birds, fish, aquatic invertebrates				Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) Caracara, burrowing owls, indigo snakes, wood storks, bald eagle	
Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.): Above list observed list in Reach 1					
Additional relevant factors: Palm Beach County					
Assessment conducted by: Nancy Allen				Assessment date(s): March 8, 2007	

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach A - 1 TD N 26.58.892 to 26.58.655 W 80.37.018 to 80.36.937 STA 139500 to 140500
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current <div>1</div> <div>0</div>	US 441 is east of the toe ditch (TD) , with the levee west of the TD or assessment area (AA). US 441 is a barrier to wildlife trying to access the AA.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current <div>1</div> <div>0</div>	Assessment area is dry. When wet, water quality is assumed poor due to run off from near by road (US 441).
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current <div>1</div> <div>0</div>	Plants: Primrose willow (<i>Ludwigia peruviana</i>), Bushy Bluestem (<i>Andropogon</i> spp.), Rush Furenia (<i>Furenia scirpoidea</i>), Bald Cypress (<i>Taxodium distichum</i>), Begger's Tick (<i>Torilis arvensis</i>), Matchhead (<i>Phyla</i> spp.)

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.1	0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = .05

Delta = [with-current]
-0.1

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach A - 2 TD N 26.58.655 to 26.57.960 W 80.36.937 to 80.36.717 STA 140500 to 144500
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current <div>7</div> <div>0</div> with	Upland buffer east of TD, followed by road and agriculture. To the west of TD is the levee and Lake O.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current <div>7</div> <div>0</div> with	Standing water in toe ditch. Water environment score higher than A-1 because adjacent to uplands, acting as a filter. Wadding birds evident from observed bird tracks along TD.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current <div>7</div> <div>0</div> with	Plants: Alligator Weed (<i>Alternanthera philoxeroides</i>), Brazilian Pepper (<i>Schinus terebinthifolius</i>), Common Reed (<i>Phragmites australis</i>), Common Hackberry (<i>Celtis occidentalis</i>), Elderberry (<i>Sambucus nigra subsp. canadensis</i>), Primrose Willow (<i>Ludwigia peruviana</i>), Smartweed (<i>Polygonum sp.</i>), Southern Willow (<i>Salix caroliniana</i>), Cabbage Palms (<i>Sabal palmetto</i>), Cattail (<i>Typha spp.</i>), Sweetscent (<i>Pluchea odorata</i>) Animals: Common Alligator (<i>Alligator mississippiensis</i>), Great Blue Heron (<i>Ardea herodias</i>), Great Egret (<i>Adrea alba</i>), Wood Stork (<i>Mycteria americana</i>), Turkey (<i>Meleagrididae gallopavo</i>)

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.7	0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 2.57

Delta = [with-current]
-0.7

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach A - 3 TD N 26.57.960 to 26.56.932 W 80.36.717 to 80.36.641 STA 144500 to 151500
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current <div>3</div> <div>with</div> <div>0</div>	Agriculture buffer to west of TD, followed by road. To the west of TD is the levee and Lake O.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current <div>6</div> <div>with</div> <div>0</div>	Standing water in toe ditch. Wadding birds evident from observed bird tracks along TD.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current <div>5</div> <div>with</div> <div>0</div>	Plants: Alligator Weed (<i>Alternanthera philoxeroides</i>), Day Flower (<i>Commelina sp.</i>), Common Reed (<i>phragmites australis</i>), Primrose Willow (<i>Ludwigia peruviana</i>), Cabbage Palms (<i>Sabal palmetto</i>), Cattail (<i>Typha sp.</i>), Water Hyacinth (<i>Eichhornia crassipes</i>), Pennywort (<i>Hydrocotyle spp.</i>) Animals: Common Gallinule (<i>Gallinula chloropus</i>), Wood Stork (<i>Mycteria americana</i>)

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
<div>0.46</div>	<div>0</div>

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 2.43

Delta = [with-current]
-0.46

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach A - 4 TD N 26.56.932 to 26.55.612 W 80.36.641 to 80.36.798 STA 151500 to 159500
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current 6 with 0	East of TD is a wetland buffer, followed by a railroad, road and agriculture. To the west of TD is the levee and Lake Okeechobee.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 6 with 0	Standing water in toe ditch. Wadding birds evident from observed bird tracks along TD.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 6 with 0	Plants: Brazilian Pepper (<i>Schinus terebinthifolius</i>), Common Reed (<i>Phragmites australis</i>), Common Hackberry (<i>Celtis occidentalis</i>), Primrose Willow (<i>Ludwigia peruviana</i>), Southern Willow (<i>Salix caroliniana</i>), Cabbage Palms (<i>Sabal palmetto</i>), Cattail (<i>Typha</i> sp.), Water Lettuce (<i>Pistia stratiotes</i>), Australine Pine (<i>Casuarina equisetifolia</i>) Animals: Great Blue Heron (<i>Ardea herodias</i>), Wood Stork (<i>Mycteria americana</i>)

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
0.6	0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 2.75

Delta = [with-current]
-0.6

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach B - 1 Cow Pasture STA 167200 to 169200
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed
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Optimal (10) Condition is optimal and fully supports wetland/surface water functions	Moderate(7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal (4) Minimal level of support of wetland/surface water functions	Not Present (0) Condition is insufficient to provide wetland/surface water functions
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.500(6)(a) Location and Landscape Support w/o pres or current with <div>2</div> <div>0</div>	Cow pasture, railroad, 1/2 mile back to C-13, Station 167200-169200
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with <div>2</div> <div>0</div>	Assessment area is dry. When wet, water quality is assumed poor due to run off.Wetland plants present.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with <div>1</div> <div>0</div>	Plants: Primrose Willow (<i>Ludwigia peruviana</i>), Soda Apple (<i>Solanum viarum</i>), Mexican Poppy (<i>Argemone mexicana</i>), Fireflag (Thalia geniculata)

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres with 0.166 0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.11

Delta = [with-current]
-0.166

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach B - 1 TD N 26.55.612 to 26.54.033 W 80.36.798 to 80.36.729 STA 159500 to 169000
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support <table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td>6</td> <td>0</td> </tr> </table>	w/o pres or current	with	6	0	East of TD is a wetland buffer, followed by a railroad, road and agriculture. To the west of TD is the levee and Lake O.
w/o pres or current	with				
6	0				
.500(6)(b)Water Environment (n/a for uplands) <table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td>6</td> <td>0</td> </tr> </table>	w/o pres or current	with	6	0	Water quality poor, water levels an flows not appropriate.
w/o pres or current	with				
6	0				
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community <table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td>6</td> <td>0</td> </tr> </table>	w/o pres or current	with	6	0	Plants: Arrowhead (<i>Sagittaria lancifolia</i>), Brazilian Pepper (<i>Schinus terebinthifolius</i>), Common Reed (<i>Phragmites australis</i>), Primrose Willow (<i>Ludwigia peruviana</i>), Southern Willow (<i>Salix caroliniana</i>), Cattail (<i>Typha</i> sp.), Water Lettuce (<i>Pistia stratiotes</i>), Alligator Flag (<i>Thalia geniculata</i>), Bald Cypress (<i>Taxodium distichum</i>) Animals: Common Gallinule (<i>Gallinula chloropus</i>)
w/o pres or current	with				
6	0				

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
0.6	0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 1.96

Delta = [with-current]
-0.6

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach B - 2 TD N 26.54.033 to 26.51.816 W 80.36.729 to 80.37.961 STA 169000 to 184000
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	East of TD is railroad, road and agriculture. To the west of TD is the levee and Lake O.
<div> <div>w/o pres or current</div> <div>3</div> </div> <div> <div>with</div> <div>0</div> </div>	
	Standing water in TD. In certain areas the width of TD is narrower than AA B-1
<div> <div>w/o pres or current</div> <div>5</div> </div> <div> <div>with</div> <div>0</div> </div>	
.500(6)(c)Community structure	Plants: Arrowhead (<i>Sagittaria lancifolia</i>), BannanTree (<i>Musa sp.</i>), Brazilian Pepper (<i>Schinus terebinthifolius</i>), Caster Bean (<i>Ricinus communis</i>), Common Reed (<i>phragmites australis</i>), Cattail (<i>Typha sp.</i>), Elderberry (<i>Sambucus ngra subsp. canadensis</i>), Hackberry (<i>Celtis occidentalis</i>), Water Lettuce (<i>Pistia stratiotes</i>), Bald Cypress (<i>Taxodium distichum</i>), Royal Palm (<i>Roystonea regia</i>), Austrailian Pine (<i>Casuarina equisetifolia</i>), Mango orchard and Bannana orchard (<i>Musa spp.</i>)
<div> <div>w/o pres or current</div> <div>4</div> </div> <div> <div>with</div> <div>0</div> </div>	

Score = sum of above scores/30 (if uplands, divide by 20)
current
or w/o pres
0.4
with
0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 3.44

Delta = [with-current]
-0.4

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach C - 1 TD N 26.51.816 to 26.51.019 W 80.37.961 to 80.38.542 STA 184000 to 190000
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed
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Optimal (10) Condition is optimal and fully supports wetland/surface water functions	Moderate(7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal (4) Minimal level of support of wetland/surface water functions	Not Present (0) Condition is insufficient to provide wetland/surface water functions
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.500(6)(a) Location and Landscape Support w/o pres or current with <div>3</div> <div>0</div>	East of TD is road and residential area. To the west of TD is the levee and Lake Okeechobee.
w/o pres or current with <div>5</div> <div>0</div>	Small puddles of water in TD.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with <div>3</div> <div>0</div>	Plants: Common Reed (<i>Phragmites australis</i>), Water Lettuce (<i>Pistia stratiotes</i>), Pennywort (<i>Hydrocotyle spp.</i>)

Score = sum of above scores/30 (if uplands, divide by 20)
current with
or w/o pres
<div>0.366</div> <div>0</div>

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 1.01

Delta = [with-current]
-0.366

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach C- 1 Wetland N 26.51.816 to 26.51.019 W 80.37.961 to 80.38.542 STA 184000 to 190000
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10) Condition is optimal and fully supports wetland/surface water functions	Moderate(7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal (4) Minimal level of support of wetland/surface water functions	Not Present (0) Condition is insufficient to provide wetland/surface water functions
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.500(6)(a) Location and Landscape Support w/o pres or current with <div>2</div> <div>0</div>	Junk yard, railroad, residential trailers,
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with <div>2</div> <div>0</div>	The flow enters the toe ditch through culverts.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with <div>2</div> <div>0</div>	Plants: Water Lettuce (<i>Pistia stratiotes</i>), Common Reed (<i>Phragmites australis</i>), Leather Fern (<i>Acrostichum spp.</i>), Pond-apple (<i>Annona glabra</i>), Hackberry (<i>Celtis occidentalis</i>), Strangler Fig (<i>Ficus spp.</i>), Southern Willow (<i>Salix caroliniana</i>) Animals: Little Blue Heron (<i>Egretta caerulea</i>), Wading Birds, American Alligator (<i>Alligator mississippiensis</i>).

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
<div>0.2</div>	<div>0</div>

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.69

Delta = [with-current]
-0.2

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach C - 2 TD N 26.51.019 to 26.47.601 W 80.38.542 to 80.41.761 STA 190000 to 218500
Impact or Mitigation Impact	Assessment conducted by: USACE, FWS, FDEP and EPA interagency team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support <table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td align="center">2</td> <td align="center">0</td> </tr> </table>	w/o pres or current	with	2	0	East of TD is residential area. To the west of TD is the levee and Lake Okeechobee.
w/o pres or current	with				
2	0				
<table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td align="center">2</td> <td align="center">0</td> </tr> </table>	w/o pres or current	with	2	0	Trickle of water in TD. Runoff from residential property lawns most likely impact water quality of TD. The TD is much narrower and shallower than B-1 AA.
w/o pres or current	with				
2	0				
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community <table border="1"> <tr> <td>w/o pres or current</td> <td>with</td> </tr> <tr> <td align="center">2</td> <td align="center">0</td> </tr> </table>	w/o pres or current	with	2	0	Plants: Canna Lily (<i>Canna liliiflora</i>), Cabbage Palms (<i>Sabal palmetto</i>), Caster Bean (<i>Ricinus communis</i>) Cattail (<i>Typha sp.</i>), Common Reed (<i>Phragmites australis</i>), Pennywort (<i>Hydrocotyle spp.</i>), Royal Palm (<i>Roystonea regia</i>) Animals: American alligator (<i>Alligator mississippiensis</i>), Snow Egret (<i>Lecucophoyx thula</i>), White Ibis (<i>Eudocimus albus</i>), Wood Stork (<i>Mycteria americana</i>)
w/o pres or current	with				
2	0				

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
0.2	0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 1.31

Delta = [with-current]
-0.2

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach D-1 TD STA 218500 to 222000
Impact or Mitigation Impact	Assessment conducted by: USACE, ESEPA, USFWS, Interagency Team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current with <div>3</div> <div>0</div>	Airport, mowed field.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with <div>3</div> <div>0</div>	Toe-ditch is dry, connected to previous ploygon by culvert.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with <div>2</div> <div>0</div>	Plants: Water lettuce (<i>Pistia stratiotes</i>), Cattail (<i>Typha spp.</i>), Primrose willow (<i>Ludwigia peruvian</i>), Common Reed (<i>Phragmites australis</i>)

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
<div>0.266</div>	<div>0</div>

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.13

Delta = [with-current]
-0.266

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach D-2, TD STA 224700 to 228500
Impact or Mitigation Impact	Assessment conducted by: USACE, ESEPA, USFWS, Interagency Team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10) Condition is optimal and fully supports wetland/surface water functions	Moderate(7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal (4) Minimal level of support of wetland/surface water functions	Not Present (0) Condition is insufficient to provide wetland/surface water functions
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.500(6)(a) Location and Landscape Support w/o pres or current <div>3</div> with <div>0</div>	Mowed field and airport to the east of TD. Levee and Lake Okeechobee to west of TD.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current <div>3</div> with <div>0</div>	Hydrologically connected to D-1 AA.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current <div>2</div> with <div>0</div>	Plants: Water Lettuce (<i>Pistia stratiotes</i>), Cattail (<i>Typha spp.</i>), Primrose Willow (<i>Ludwigia peruvian</i>), Common Reed (<i>Phragmites australis</i>)

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres
with
0.266
0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.09

Delta = [with-current]
-0.266

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name Herbert Hoover Dike	Application Number	Assessment Area Name or Number Subreach 1D-3, TD STA 228500 to 235500
Impact or Mitigation Impact	Assessment conducted by: USACE, ESEPA, USFWS, Interagency Team	Assessment date: 13-Mar-07

Scoring Guidance The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Optimal (10) Condition is optimal and fully supports wetland/surface water functions	Moderate(7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal (4) Minimal level of support of wetland/surface water functions	Not Present (0) Condition is insufficient to provide wetland/surface water functions
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.500(6)(a) Location and Landscape Support w/o pres or current with 1 0	Road to the east of TD followed by agriculture. Very narrow toe-ditch.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with 1 0	Dry, 2 ft wide. Water levels and flows are not appropriate.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with 1 0	Plants: No vegetation, maintained (mowed).

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres with 0.1 0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.03

Delta = [with-current]
-0.1

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

C.2 MITIGATION

The preferred alternative is similar to the alternative recommended in the draft EIS of July 1999. The design called for a seepage berm which would have required backfilling the toe ditch wetlands. As part of their concurrence with the draft EIS, the U.S. Fish and Wildlife Service (USFWS) recommended in the Coordination Act Report (CAR) that the Corps provide mitigation for the backfilling of Reach 1 wetlands by restoration of degraded wetlands. The Corps concurred with the mitigation recommendations and carried 57 acres of Melaleuca removal adjacent to Reach 2 (near the Alvin Ward Boat Ramp) and maintained this area (see **Figures C-13 through C-18**). The UMAM was used to assess the value of habitat created. The UMAM scored the habitat value as equivalent to 17.1 relative functional gain (RFG) units, see the UMAM qualitative and quantitative scoring sheets on next page. The Final HHD Reach 1 EA, dated January 2007, assessed the impacts of backfilling the toe ditch wetlands in the identified focus areas along Reach 1; resulting in 3.8 functional loss units. Therefore, 3.8 RFG units were deducted from the 17.1 RFG units to compensate for the backfilling of the identified focus areas (see **Table C-2**).

TABLE C-2: RELATIVE FUNCTIONAL GAIN UNITS AVAILABLE

Total Relative Functional Gain Units Created through Mitigation	Functional Loss Units for Backfilling the Toe Ditch in Focus Areas (Jan. 2007 EA)	RFG Units Still Available
17.1	-3.8	13.3

Applying the remaining RFG units from the Melaleuca removal to the 12.8 functional loss units for the preferred alternative will result in a net RFG unit 0.5 (**Table C-3**).

TABLE C-3: MITIGATION CREDITS AVAILABLE AFTER IMPLEMENTATION OF PREFERRED ALTERNATIVE

Relative Function Gain (RFG) Units Still Available from Previous Mitigation	Functional Loss units for the preferred alternative (minus work already covered in Jan. 2007 EA)	Net RFG Units
13.3	-12.8	0.5

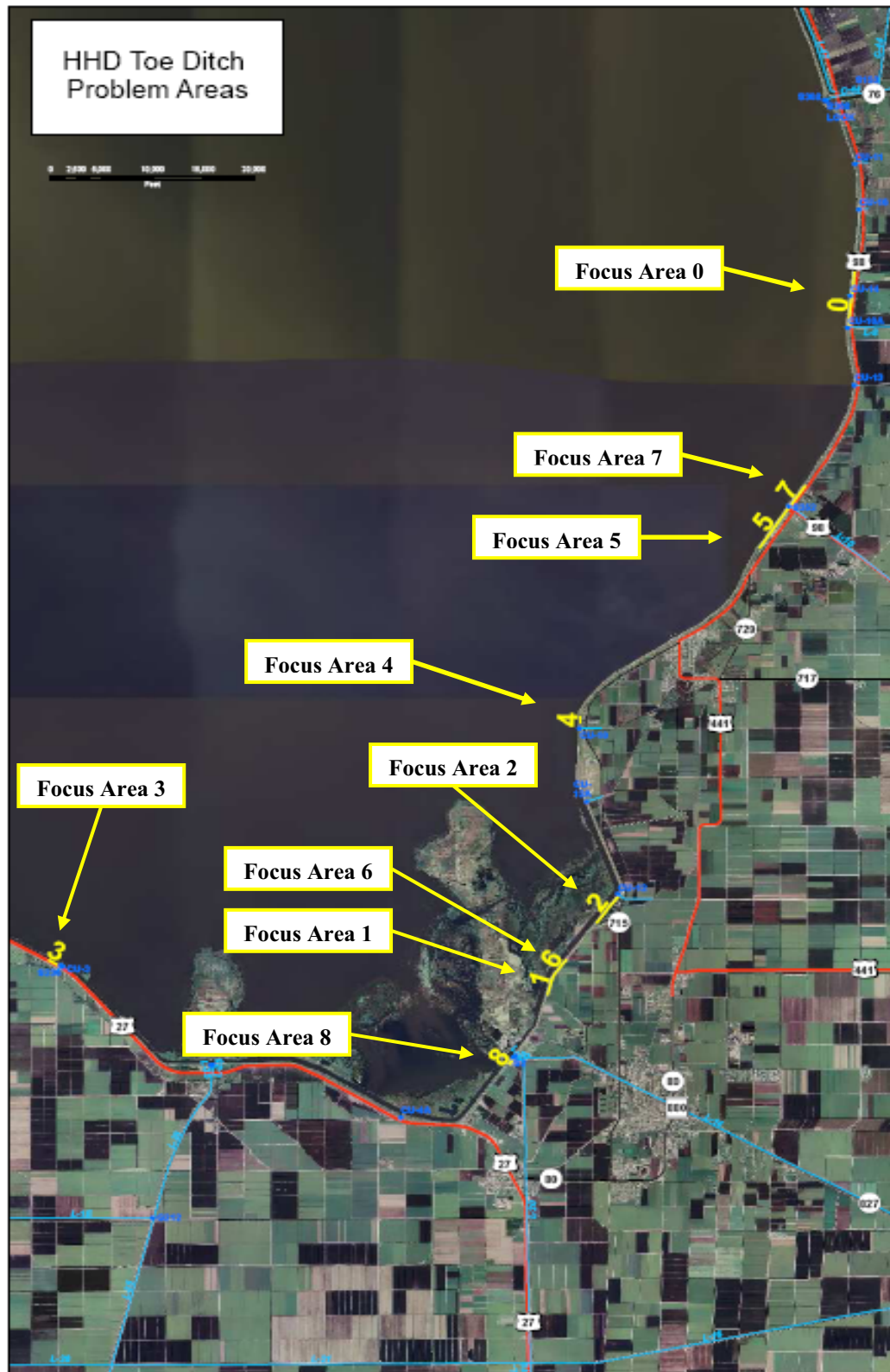


FIGURE C-12: LOCATION OF FOCUS AREAS (FUNCTION LOSS UNITS FOR FOCUS AREAS WERE COMPENSATED IN JAN 2007 EA)

TABLE C-4: FOCUS AREA DESCRIPTION AND LENGTH

Focus Area	Location	Length of Repair w/in ROW	Length Outside of ROW	Functional Loss Units
0	North of C-10A	6000 ft	0	1.8
1	Sugar Ramp South 1/2 mile	800 ft	1900 ft	0/0.1
2	South of C-12 (Rardin Park) to South End of Quarry	Different fix for this focus area	Different fix for this focus area	0
3	West of S-236	1000 ft	0	0.1
4	1/4 mile North of C-10 for 500 ft	500 ft	0	0.1
5	S-352 South for 1/2 mile	2640 ft	0	1.2
6	Sugar Ramp North for 1/4 mile	0	1600 ft	0.1
7	S-352 North for 1/2 mile	2640 ft	0	0.6
8	South of S-351	600 ft	0	0

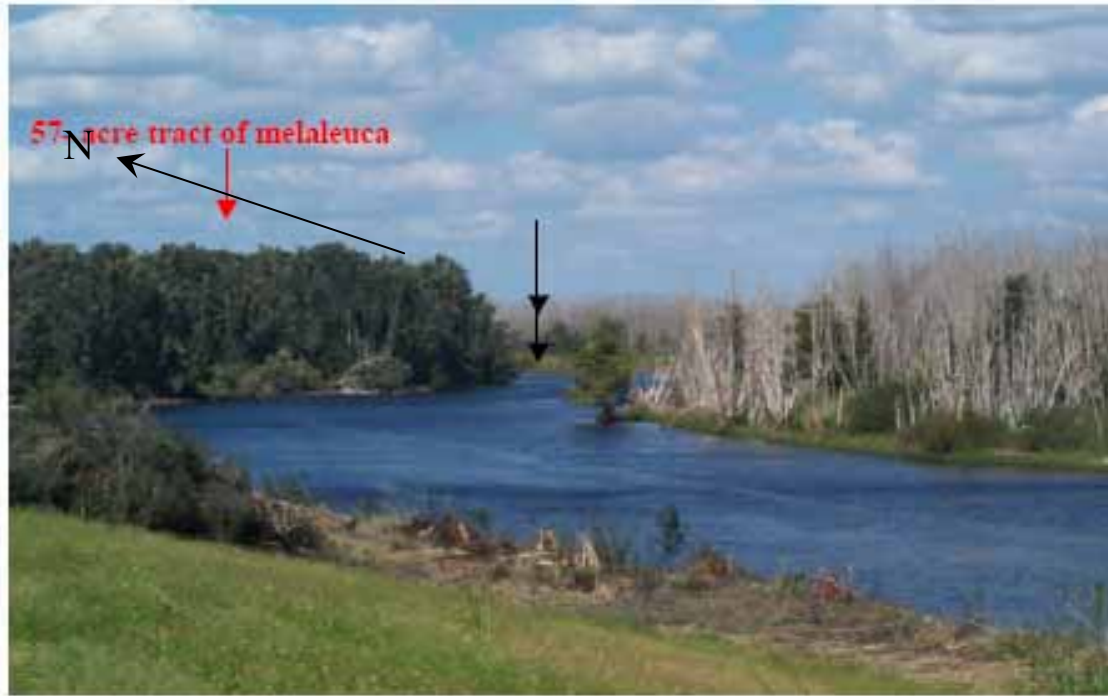


FIGURE C-13: PRE-MITIGATION CONDITIONS (NOTE THE EXTENT OF MELALEUCA)



FIGURE C-14: PRE-MITIGATION CONDITIONS (CLOSE-UP)



FIGURE C-15: MELALEUCA REMOVAL



FIGURE C-16: MELALEUCA REMOVAL



FIGURE C-17: POST MITIGATION SITE



FIGURE C-18: POST MITIGATION SITE

**C.3 FLORIDA ADMINISTRATIVE CODE CHAPTER 62-345 UNIFORM
MITIGATION ASSESSMENT METHOD**

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CHAPTER 62-345 UNIFORM MITIGATION ASSESSMENT METHOD

62-345.100	Intent and Scope.
62-345.200	Definitions.
62-345.300	Assessment Method Overview and Guidance.
62-345.400	Qualitative Characterization - Part I.
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62-345.600	Time Lag, Risk, and Mitigation Determination.
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62-345.100 Intent and Scope.

(1) The intent of this rule is to fulfill the mandate of subsection 373.414(18), F.S., which requires the establishment of a uniform mitigation assessment method to determine the amount of mitigation needed to offset adverse impacts to wetlands and other surface waters and to award and deduct mitigation bank credits. This chapter shall apply to those impacts subject to review under Section 373.414, F.S., excluding subparagraphs 373.414(1)(a)1., 3., 5., 6. and (b)3., F.S.

(2) Except as specified above, the methodology in this chapter provides a standardized procedure for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss. It does not assess whether the adverse impact meets other criteria for issuance of a permit, nor the extent that such impacts may be approved. This rule supersedes existing ratio guidelines or requirements concerning the amount of mitigation required to offset an impact to wetlands or other surface waters. Upon a determination that mitigation is required to offset a proposed impact, the methodology set forth in this rule shall be used to quantify the acreage of mitigation, or the number of credits from a mitigation bank or regional offsite mitigation area, required to offset the impact. This method is also used to determine the degree of improvement in ecological value of proposed mitigation bank activities. When applying this method, reasonable scientific judgment must be used.

(3) This method is not applicable to:

(a) Activities for which mitigation is not required;

(b) Activities authorized under general permits under Part IV of Chapter 373, F.S., for which special forms of mitigation are specified in the rule establishing the general permit;

(c) Activities in North Trail Basin and Bird Drive Basin in Miami-Dade County for which mitigation is specified in Department of Environmental Protection Permit Number 132416479, issued February 15, 1995 to Everglades National Park for a mitigation bank in the Hole in the Donut, which is incorporated by reference herein;

(d) Activities for which mitigation is determined under Section 373.41492, F.S.;

(e) Florida Department of Transportation permit applications where mitigation is provided under a plan developed by a water management district and approved by Department of Environmental Protection final order pursuant to Section 373.4137, F.S., prior to the effective date of this rule;

(f) Activities for which mitigation is determined under Section 338.250, F.S. (Central Florida Beltway);

(g) Impacts that are offset under the net improvement provision of subparagraph 373.414(1)(b)3., F.S.;

(h) Fishing or recreational values, pursuant to subparagraph 373.414(1)(a)4., F.S.; or

(i) Mitigation for mangrove trimming and alteration as required and implemented in accordance with Section 403.9332, F.S.

(4) This method is not intended to supersede or replace existing rules regarding cumulative impacts, the prevention of secondary impacts, reduction and elimination of impacts, or to determine the appropriateness of the type of mitigation proposed.

(5) For the following types of secondary impacts, the amount and type of mitigation required to offset these impacts shall include measures such as the implementation of management plans, participation in a wildlife management park established by the Florida Fish and Wildlife Conservation Commission, incorporation of culverts or bridged crossings designed to facilitate wildlife movement, fencing to limit access, reduced speed zones, plans to protect significant historical or archeological resources, or other measures designed to offset the secondary impact, rather than the implementation of Rules 62-345.400 through 62-345.600, F.A.C.:

(a) Secondary impacts to fish or wildlife caused by collision with boat traffic, automobile traffic, or towers;

(b) Secondary impacts to aquatic or wetland dependent listed animal species caused by impacts to uplands used by such species for nesting or denning; or

(c) Secondary impacts to historical or archeological resources.

(6) Pursuant to paragraph 373.414(18)(b), F.S., an entity that has received a mitigation bank permit issued by the Department of Environmental Protection or a water management district under Sections 373.4135 and 373.4136, F.S., prior to the adoption of this rule must have impact sites assessed for the purpose of deducting bank credits using the credit assessment method, including any functional assessment methodology, that was in place when the bank was permitted. A permitted mitigation bank has the option to modify the mitigation bank permit to have its credits re-assessed under the method in this chapter, and thereafter have its credits deducted using the method adopted in this chapter. In accordance with Section 373.4136 and paragraph 373.414(18)(b), F.S., the number of credits awarded must be based on the degree of improvement in ecological value expected to result from the establishment and operation of the mitigation bank, as determined using the assessment methodology in this chapter.

(7) An application for a permit or other authorization involving mitigation that is pending on or before the effective date of this chapter shall be reviewed under the applicable rules, ordinances, and special acts in effect before the effective date of this chapter, unless the applicant elects to amend the application to be reviewed under this chapter.

(8) Applications to modify a conceptual, standard, standard general or individual permit issued prior to the effective date of this chapter, shall be evaluated under the applicable mitigation assessment criteria in effect at the time the permit was issued, unless the applicant elects to have the application reviewed under this chapter or unless the proposed modification is reasonably expected to lead to substantially different or substantially increased water resource impacts.

(9) An application for a permit under part IV of Chapter 373, F.S., for an activity associated with mining operations that qualifies for the exemption in subsection 373.414(15), F.S., shall be reviewed under the applicable rules identified in subsection 373.414(15), F.S.

(10) The Department and Water Management Districts shall develop and conduct training workshops for agency staff, local governments, and the public on the application of this rule, prior to the effective date of this rule.

Specific Authority 373.026(7), 373.043, 373.414(9), (18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.200 Definitions.

(1) “Assessment area” means all or part of a wetland or surface water impact site, or a mitigation site, that is sufficiently homogeneous in character, impact, or mitigation benefits to be assessed as a single unit.

(2) “Reviewing agency” means the Florida Department of Environmental Protection, or any water management district, local government or other governmental agency required by subsection 373.414(18), F.S., to use this methodology.

(3) “Ecological value” means the value of functions performed by uplands, wetlands, and other surface waters to the abundance, diversity, and habitats of fish, wildlife, and listed species. Included are functions such as providing cover and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain support; natural water storage, natural flow attenuation, and water quality improvement which enhances fish, wildlife, and listed species utilization.

(4) “Impact site” means wetlands and other surface waters as delineated pursuant to Chapter 62-340, F.A.C., that would be impacted by the project. Uplands shall not be included as part of the impact site.

(5) “Indicators” means physical, chemical, or biological indications of wetland or other surface waters function.

(6) “Invasive Exotic” for purposes of this rule means animal species that are outside of their natural range or zone of dispersal and have or are able to form self-sustaining and expanding populations in communities in which they did not previously occur, and those plant species listed in the Florida Exotic Pest Plant Council’s 2001 List of Invasive Species Category I and II, which is incorporated by reference herein, and may be found on the Internet at www.fleppc.org or by writing to the Bureau of Beaches and Wetland Resources, Department of Environmental Protection, 2600 Blair Stone Road, MS 2500, Tallahassee, FL 32399-2400.

(7) “Listed species” means those animal species that are endangered, threatened or of special concern and are listed in Rules 68A-27.003, 68A-27.004, and 68A-27.005, F.A.C., and those plant species listed in 50 Code of Federal Regulations 17.12, when such plants are located in a wetland or other surface water.

(8) “Mitigation credit” or “credit” means a standard unit of measure which represents the increase in ecological value resulting from restoration, enhancement, preservation, or creation activities.

(9) “Mitigation site” means wetlands and other surface waters as delineated pursuant to Chapter 62-340, F.A.C., or uplands, that are proposed to be created, restored, enhanced, or preserved by the mitigation project.

(10) “With impact assessment” means the reasonably anticipated outcome at an assessment area assuming the proposed impact is conducted.

(11) “With mitigation assessment” means the outcome at an assessment area assuming the proposed mitigation is successfully conducted.

(12) “Without preservation assessment” means the reasonably anticipated outcome at an assessment area assuming the area is not preserved.

Specific Authority 373.026(7), 373.043, 373.414(9), (18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.300 Assessment Method Overview and Guidance.

(1) When an applicant proposes mitigation for impacts to wetlands and surface waters as part of an environmental resource permit or wetland resource permit application, the applicant will be responsible for submitting the necessary supporting information for the application of Rules 62-345.400-.600, F.A.C., of this chapter and the reviewing agency will be responsible for verifying this information and applying this assessment method to determine the amount of mitigation necessary to offset the proposed impacts. When an applicant submits a mitigation bank or regional mitigation permit application, the applicant will be responsible for submitting the necessary supporting information for the application of Rules 62-345.400-.600, F.A.C., of this chapter and the reviewing agency will be responsible for verifying this information and applying this assessment method to determine the potential amount of mitigation to be provided by the bank or regional mitigation area.

(2) To determine the value of functions provided by impact and mitigation sites, the method incorporates the following considerations: current condition (see subsection 62-345.500(6), F.A.C.); hydrologic connection (see paragraph 62-345.400(1)(d), F.A.C.); uniqueness (see paragraph 62-345.400(1)(f), F.A.C.); location (see subsections 62-345.400(1) and 62-345.500(7), F.A.C.); fish and wildlife utilization (see paragraph 62-345.400(1)(h), F.A.C.); time lag (see subsection 62-345.600(1), F.A.C.); and mitigation risk (see subsection 62-345.600(2), F.A.C.).

(3) The assessment method is designed to be used in any type of impact site or mitigation site in any geographic region of the state. The inherent flexibility required for such a method is accomplished in a multi-part approach that consists of the following processes:

(a) Conduct qualitative characterization of both the impact and mitigation assessment areas (Part I) that identifies the functions provided by the area to fish and wildlife and their habitat and establishes a framework for quantitative assessment.

(b) Conduct quantitative assessment (Part II) of the impact and mitigation sites and use the numerical scores to compare the reduction of ecological value due to proposed impacts and the gain in ecological value due to proposed mitigation and to determine whether a sufficient amount of mitigation is proposed.

(c) Adjust the gain in ecological value from either upland or wetland preservation in accordance with subsection 62-345.500(3), F.A.C.

(d) For mitigation assessment areas, assess the proposed mitigation for time lag and risk.

(e) The functional gain or loss for mitigation and impact assessment areas, respectively, is determined by applying the formulas in subsection 62-345.600(3), F.A.C., to ascertain the number of mitigation bank credits to be awarded and debited and the amount of mitigation needed to offset the impacts to wetlands and other surface waters.

(4) Part I of this method provides a descriptive framework to characterize the assessment area and the functions provided by that area. Part II of this method provides indicators of wetland and other surface water function, which are scored based on the framework developed in Part I. Part I must be completed and referenced by the user of this method when scoring the assessment area in Part II. An impact or mitigation site may contain more than one assessment area, each of which shall be independently evaluated under this method.

(5) The degree of ecological change on a site must be determined for both the impact and mitigation assessment areas by the mathematical difference in the Part II scores established pursuant to Rule 62-345.500, F.A.C., between the current condition and with-impact condition assessment, and between the current condition or without preservation and the with mitigation condition assessments. This difference is termed the "delta." This formula must be applied to all assessment areas within both proposed impact sites and mitigation sites (including mitigation banks and regional offsite mitigation areas when applicable).

Specific Authority 373.026(7), 373.043, 373.414(9), (18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.400 Qualitative Characterization - Part I.

(1) An impact or mitigation assessment area must be described with sufficient detail to provide a frame of reference for the type of community being evaluated and to identify the functions that will be evaluated. When an assessment area is an upland proposed as mitigation, functions must be related to the benefits provided by that upland to fish and wildlife of associated wetlands or other surface waters. Information for each assessment area must be sufficient to identify the functions beneficial to fish and wildlife and their habitat that are characteristic of the assessment area, based on currently available information, such as aerial photographs, topographic maps, geographic information system data and maps, site visits, scientific articles, journals, other professional reports, field verification when needed, and reasonable scientific judgment. The information provided by the applicant for each assessment area must address the following, as applicable:

(a) Special water classifications, such as whether the area is in an Outstanding Florida Water, an Aquatic Preserve, a Class II water approved, restricted, conditionally approved, conditionally restricted for shellfish harvesting, or an Area of Critical State Concern;

(b) Significant nearby features that might affect the values of the functions provided by the assessment area, such as areas with regionally significant ecological resources or habitats (national or state parks, forests, or reserves; Outstanding National Resource Waters and associated watershed; Outstanding Florida Waters and associated watershed; other conservation areas), major industry, or commercial airport;

(c) Assessment area size;

(d) Geographic relationship and hydrologic connection between the assessment area and any contiguous wetland or other surface waters, or uplands, as applicable;

(e) Classification of assessment area, including description of past alterations that affect the classification. Classification shall be based on Florida Land Use, Cover and Form Classification System (1999) (FLUCC) codes, which is incorporated by reference herein. In addition, the applicant may further classify the assessment area using the 26 Communities of Florida, Soils Conservation Service (February 1981), which is incorporated by reference herein; A Hydrogeomorphic Classification for Wetlands, Wetland Research Program Technical Report WRP-DE-4, Mark M. Brinson (August 1993), which is incorporated by reference herein; or other sources that, based on reasonable scientific judgment, describe the natural communities in Florida;

(f) Uniqueness when considering the relative rarity of the wetland or other surface water and floral and faunal components, including listed species, on the assessment area in relation to the surrounding regional landscape;

(g) Functions performed by the assessment area. Functions to be considered are: providing cover, substrate, and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain support; and natural water storage, natural flow attenuation, and water quality improvement, which enhances fish, wildlife, and listed species utilization;

(h) Anticipated wildlife utilization and type of use (feeding, breeding, nesting, resting, or denning), and applicable listing classifications (threatened, endangered, or species of special concern as defined by Rules 68A-27.003, 68A-27.004, and 68A-27.005, F.A.C.). The list developed for the assessment area need not include all species which use the area, but must include all listed species in addition to those species that are characteristic of the area and the functions provided by the area, considering the size and location of the assessment area. Generally, wildlife surveys will not be required. The need for a wildlife survey will be determined by the likelihood that the site is used by listed species, considering site characteristics and the range and habitat needs of such species, and whether the proposed system will impact that use;

(i) Whether any portion of the assessment area has been previously used as mitigation for a prior issued permit; and

(j) Any additional information that is needed to accurately characterize the ecological values of the assessment area and functions provided.

Specific Authority 373.026(7), 373.043, 373.414(9), (18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.500 Assessment and Scoring - Part II.

(1) Utilizing the frame of reference established in Part I, the information obtained under this part must be used to determine the degree to which the assessment area provides the functions identified in Part I and the amount of function lost or gained by the project. Each impact assessment area and each mitigation assessment area must be assessed under two conditions.

(a) Current condition or, in the case of preservation mitigation, without preservation – For assessment areas where previous impacts that affect the current condition are temporary in nature, consideration will be given to the inherent functions of these areas relative to seasonal hydrologic changes, and expected vegetation regeneration and projected habitat functions if the use of the area were to remain unchanged. When evaluating impacts to a previously permitted mitigation site that has not achieved its intended function, the reviewing agency shall consider the functions the mitigation site was intended to offset and any delay or reduction in offsetting those functions that may be caused by the project. Previous construction or alteration undertaken in violation of Part IV, Chapter 373, F.S., or Sections 403.91-929, F.S. (1984 Supp.), as amended, or rule, order or permit adopted or issued thereunder, will not be considered as having diminished the condition and relative value of a wetland or surface water, when assigning a score under this part. When evaluating wetlands or other surface waters that are within an area that is subject to a recovery strategy pursuant to Chapter 40D-80, F.A.C., impacts from water withdrawals will not be considered when assigning a score under this part.

(b) “With mitigation” or “with impact” – The “with mitigation” and “with impact” assessments are based on the reasonably expected outcome, which may represent an increase, decrease, or no change in value relative to current conditions. For the “with impact” and “with mitigation” assessments, the evaluator will assume that all other necessary regulatory authorizations required for the proposed project have been obtained and that construction will be consistent with such authorizations. The “with mitigation” assessment will be scored only when reasonable assurance has been provided that the proposed plan can be conducted.

(2) Upland mitigation assessment areas shall be scored using the location and community structure indicators listed in subsection 62-345.500(6), F.A.C. Scoring of these indicators for the upland assessment areas shall be based on benefits provided to the fish and wildlife of the associated wetlands or other surface waters, considering the current or anticipated ecological value of those wetlands and other surface waters.

(a) For upland preservation, the gain in ecological value is determined by the mathematical difference between the score of the upland assessment area with the proposed preservation measure and the upland assessment area without the proposed preservation measure. The resulting delta is then multiplied by the preservation adjustment factor contained in subsection 62-345.500(3), F.A.C.

(b) For upland enhancement or restoration, the value provided shall be determined by the mathematical difference between the score of the upland assessment area with the proposed restoration or enhancement measure and the current condition of the upland assessment area.

(c) For uplands proposed to be converted to wetlands or other surface waters through creation or restoration measures, the upland areas shall be scored as “zero” in their current condition. Only the “with mitigation” assessment shall be scored in accordance with the indicators listed in subsection 62-345.500(6), F.A.C.

(3)(a) When assessing preservation, the “with mitigation” assessment shall consider the potential of the assessment area to perform current functions in the long term, considering the protection mechanism proposed, and the “without preservation” assessment shall evaluate the assessment area’s functions considering the extent and likelihood of what activities would occur if it were not preserved, the temporary or permanent effects of those activities, and the protection provided by existing easements, restrictive covenants, or state, federal, and local rules, ordinances and regulations. The gain in ecological value is determined by the mathematical difference between the Part II scores for the “with mitigation” and “without preservation” (the delta) multiplied by a preservation adjustment factor. The preservation adjustment factor shall be scored on a scale from 0 (no preservation value) to 1 (optimal preservation value), on one-tenth increments. The score shall be assigned based on the applicability and relative significance of the following considerations:

1. The extent to which proposed management activities within the preserve area promote natural ecological conditions such as fire patterns or the exclusion of invasive exotic species.

2. The ecological and hydrological relationship between wetlands, other surface waters, and uplands to be preserved.
 3. The scarcity of the habitat provided by the proposed preservation area and the degree to which listed species use the area.
 4. The proximity of the area to be preserved to areas of national, state, or regional ecological significance, such as national or state parks, Outstanding Florida Waters, and other regionally significant ecological resources or habitats, such as lands acquired or to be acquired through governmental or non-profit land acquisition programs for environmental conservation, and whether the areas to be preserved include corridors between these habitats.
 5. The extent and likelihood of potential adverse impacts if the assessment area were not preserved.
- (b) The preservation adjustment factor is multiplied by the mitigation delta assigned to the preservation proposal to yield an adjusted mitigation delta for preservation.
- (4) The evaluation must be based on currently available information, such as aerial photographs, topographic maps, geographic information system data and maps, site visits, scientific articles, journals, other professional reports, and reasonable scientific judgment.
- (5) Indicators of wetland and other surface water function listed in this part are scored on a relative scale of zero to ten, based on the level of function that benefits fish and wildlife. For the purpose of providing guidance, descriptions are given for four general categories of scores: optimal (10), moderate (7), minimal (4), and not present (0). Any whole number score between 0-10 may be used that is a best fit to a single or combination of descriptions and in relation to the optimal level of function of that community type or habitat.
- (6) Three categories of indicators of wetland function (location and landscape support, water environment and community structure) listed below are to be scored to the extent that they affect the ecological value of the assessment area. Upland mitigation assessment areas shall be scored for location and community structure only.
- (a) Location and Landscape Support – The value of functions provided by an assessment area to fish and wildlife are influenced by the landscape position of the assessment area and its relationship with surrounding areas. While the geographic location of the assessment area does not change, the ecological relationship between the assessment area and surrounding landscape may vary from the current condition to the “with impact” and “with mitigation” conditions. Many species that nest, feed or find cover in a specific habitat or habitat type are also dependent in varying degrees upon other habitats, including upland, wetland and other surface waters, that are present in the regional landscape. For example, many amphibian species require small isolated wetlands for breeding pools and for juvenile life stages, but may spend the remainder of their adult lives in uplands or other wetland habitats. If these habitats are unavailable or poorly connected in the landscape or are degraded, then the value of functions provided by the assessment area to the fish and wildlife identified in Part I is reduced. The location of the assessment area shall be considered to the extent that fish and wildlife utilizing the area have the opportunity to access other habitats necessary to fulfill their life history requirements. The availability, connectivity, and quality of offsite habitats, and offsite land uses which might adversely impact fish and wildlife utilizing these habitats, are factors to be considered in assessing the location of the assessment area. The location of the assessment area shall be considered relative to offsite and upstream hydrologic contributing areas and to downstream and other connected waters to the extent that the diversity and abundance of fish and wildlife and their habitats is affected in these areas. The opportunity for the assessment area to provide offsite water quantity and quality benefits to fish and wildlife and their habitats downstream and in connected waters is assessed based on the degree of hydrologic connectivity between these habitats and the extent to which offsite habitats are affected by discharges from the assessment area. It is recognized that isolated wetlands lack surface water connections to downstream waters and as a result, do not perform certain functions (e.g., detrital transport) to benefit downstream fish and wildlife; for such wetlands, this consideration does not apply.
1. A score of (10) means the assessment area is ideally located and the surrounding landscape provides full opportunity for the assessment area to perform beneficial functions at an optimal level. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:
 - a. Habitats outside the assessment area represent the full range of habitats needed to fulfill the life history requirements of all wildlife listed in Part I and are available in sufficient quantity to provide optimal support for these wildlife.
 - b. Invasive exotic or other invasive plant species are not present in the proximity of the assessment area.
 - c. Wildlife access to and from habitats outside the assessment area is not limited by distance to these habitats and is unobstructed by landscape barriers.
 - d. Functions of the assessment area that benefit downstream fish and wildlife are not limited by distance or barriers that reduce the opportunity for the assessment area to provide these benefits.
 - e. Land uses outside the assessment area have no adverse impacts on wildlife in the assessment area as listed in Part I.
 - f. The opportunity for the assessment area to provide benefits to downstream or other hydrologically connected areas is not limited by hydrologic impediments or flow restrictions.
 - g. Downstream or other hydrologically connected habitats are critically or solely dependent on discharges from the assessment area and could suffer severe adverse impacts if the quality or quantity of these discharges were altered.
 - h. For upland mitigation assessment areas, the uplands are located so as to provide optimal protection of wetland functions.
 2. A score of (7) means that, compared to the ideal location, the location of the assessment area limits its opportunity to perform beneficial functions to 70% of the optimal ecological value. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

a. Habitats outside the assessment area are available in sufficient quantity and variety to provide optimal support for most, but not all, of the wildlife listed in Part I, or certain wildlife populations may be limited due to the reduced availability of habitats needed to fulfill their life history requirements.

b. Some of the plant community composition in the proximity of the assessment area consists of invasive exotic or other invasive plant species, but cover is minimal and has minimal adverse effect on the functions provided by the assessment area.

c. Wildlife access to and from habitats outside the assessment area is partially limited, either by distance or by the presence of barriers that impede wildlife movement.

d. Functions of the assessment area that benefit fish and wildlife downstream are somewhat limited by distance or barriers that reduce the opportunity for the assessment area to provide these benefits.

e. Land uses outside the assessment area have minimal adverse impacts on fish and wildlife identified in Part I.

f. The opportunity for the assessment area to provide benefits to downstream or other hydrologically connected areas is limited by hydrologic impediments or flow restrictions such that these benefits are provided with lesser frequency or lesser magnitude than would occur under optimal conditions.

g. Downstream or other hydrologically connected habitats derive significant benefits from discharges from the assessment area and could suffer substantial adverse impacts if the quality or quantity of these discharges were altered.

h. For upland mitigation assessment areas, the uplands are located so as to provide significant, but suboptimal, protection of wetland functions.

3. A score of (4) means that, compared to the ideal location, the assessment area location limits its opportunity to perform beneficial functions to 40% of the optimal ecological value. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

a. Availability of habitats outside the assessment area is fair, but fails to provide support for some species of wildlife listed in Part I, or provides minimal support for many of the species listed in Part I.

b. The majority of the plant community composition in the proximity of the assessment area consists of invasive exotic or other invasive plant species that adversely affect the functions provided by the assessment area.

c. Wildlife access to and from habitats outside the assessment area is substantially limited, either by distance or by the presence of barriers which impede wildlife movement.

d. Functions of the assessment area that benefit fish and wildlife downstream are limited by distance or barriers which substantially reduce the opportunity for the assessment area to provide these benefits.

e. Land uses outside the assessment area have significant adverse impacts on fish and wildlife identified in Part I.

f. The opportunity for the assessment area to provide benefits to downstream or other hydrologically connected areas is limited by hydrologic impediments or flow restrictions, such that these benefits are rarely provided or are provided at greatly reduced levels compared to optimal conditions.

g. Downstream or other hydrologically connected habitats derive minimal benefits from discharges from the assessment area but could be adversely impacted if the quality or quantity of these discharges were altered.

h. For upland mitigation assessment areas, the uplands are located so as to provide minimal protection of wetland functions.

4. A score of (0) means that the location of the assessment area provides no habitat support for wildlife utilizing the assessment area and no opportunity for the assessment area to provide benefits to fish and wildlife outside the assessment area. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

a. No habitats are available outside the assessment area to provide any support for the species of wildlife listed in Part I.

b. The plant community composition in the proximity of the assessment area consists predominantly of invasive exotic or other invasive plant species such that little or no function is provided by the assessment area.

c. Wildlife access to and from habitats outside the assessment area is precluded by barriers or distance.

d. Functions of the assessment area that would be expected to benefit fish and wildlife downstream are not present.

e. Land uses outside the assessment area have a severe adverse impact on wildlife in the assessment area as listed in Part I.

f. There is negligible or no opportunity for the assessment area to provide benefits to downstream or other hydrologically connected areas due to hydrologic impediments or flow restrictions that preclude provision of these benefits.

g. Discharges from the assessment area provide negligible or no benefits to downstream or hydrologically connected areas and these areas would likely be unaffected if the quantity or quality of these discharges were altered.

h. For upland mitigation assessment areas, the uplands are located so as to provide no protection of wetland functions.

(b) Water Environment – The quantity of water in an assessment area, including the timing, frequency, depth and duration of inundation or saturation, flow characteristics, and the quality of that water, may facilitate or preclude its ability to perform certain functions and may benefit or adversely impact its capacity to support certain wildlife. Hydrologic requirements and tolerance to hydrologic alterations and water quality variations vary by ecosystem type and the wildlife utilizing the ecosystem. Hydrologic conditions within an assessment area, including water quantity and quality, must be evaluated to determine the effect of these conditions on the functions performed by area and the extent to which these conditions benefit or adversely affect wildlife. Water quality within wetlands and other surface waters is affected by inputs from surrounding and upstream areas and the ability of the wetland or surface water system to assimilate those inputs. Water quality within the assessment area can be directly observed or can be inferred based on available water quality data, on-site indicators, adjacent land uses and estimated pollutant removal efficiencies of contributing surface water management systems. Hydrologic conditions in the assessment area are a result of external hydrologic

inputs and the water storage and discharge characteristics of the assessment area. Landscape features outside the assessment area, such as impervious surfaces, borrow pits, levees, berms, swales, ditches, canals, culverts, or control structures, may affect hydrologic conditions in the assessment area. Surrounding land uses may also affect hydrologic conditions in the assessment area if these land uses increase discharges to the assessment area, such as agricultural discharges of irrigation water, or decrease discharges, such as wellfields or mined areas.

1. A score of (10) means that the hydrology and water quality fully supports the functions and provides benefits to fish and wildlife at optimal capacity for the assessment area. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- a. Water levels and flows appear appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- b. Water level indicators are distinct and consistent with expected hydrologic conditions for the type of system being evaluated.
- c. Soil moisture is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. No evidence of soil desiccation, oxidation or subsidence is observed.
- d. Soil erosion or deposition patterns are not atypical or indicative of altered flow rates or points of discharge.
- e. Evidence of fire history does not indicate atypical fire frequency or severity due to excessive dryness.
- f. Vegetation or benthic community zonation in all strata are appropriate for the type of system being evaluated and does not indicate atypical hydrologic conditions.
- g. Vegetation shows no signs of hydrologic stress such as excessive mortality, leaning or fallen trees, thinning canopy or signs of insect damage or disease which may be associated with hydrologic stress.
- h. Presence or evidence of use by animal species with specific hydrologic requirements is consistent with expected hydrologic conditions for the system being evaluated.
- i. Plant community composition is not characterized by species tolerant of and associated with water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.
- j. Direct observation of standing water indicates no water quality degradation such as discoloration, turbidity, or oil sheen.
- k. Existing water quality data indicates conditions are optimal for the type of community and would fully support the ecological values of the area.

l. Water depth, wave energy, currents and light penetration are optimal for the type of community being evaluated.

2. A score of (7) means that the hydrology and water quality supports the functions and provides benefits to fish and wildlife at 70% of the optimal capacity for the assessment area. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- a. Water levels and flows are slightly higher or lower than appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- b. Water level indicators are not as distinct or as consistent as expected for hydrologic conditions for the type of system being evaluated.
- c. Although soil oxidation or subsidence is minimal, soils are drier than expected for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- d. Soil erosion or deposition patterns indicate minor alterations in flow rates or points of discharge.
- e. Fire history evidence indicates that fire frequency or severity may be more than expected for the type of system being evaluated, possibly due to dryness.
- f. Vegetation or benthic community zonation in some strata is inappropriate for the type of system being evaluated, indicating atypical hydrologic conditions.
- g. Vegetation has slightly greater than normal mortality, leaning or fallen trees, thinning canopy or signs of insect damage or disease which may be associated with some hydrologic stress.
- h. Presence or evidence of use by animal species with specific hydrologic requirements is less than expected or species present have more generalized hydrologic requirements.
- i. Some of the plant community composition consists of species tolerant of and associated with moderate water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.
- j. Direct observation of standing water indicates slight water quality degradation such as discoloration, turbidity, or oil sheen.
- k. Existing water quality data indicates slight deviation from what is normal, but these variations in parameters, such as salinity or nutrient loading, are not expected to cause more than minimal ecological effects.
- l. Water depth, wave energy, currents and light penetration are generally sufficient for the type of community being evaluated but are expected to cause some changes in species, age classes and densities.

3. A score of (4) means that the hydrology and water quality supports the functions and provides benefits to fish and wildlife at 40% of the optimal capacity for the assessment area. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- a. Water levels and flows are moderately higher or lower than appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.

b. Water level indicators are not distinct and are not consistent with the expected hydrologic conditions for the type of system being evaluated.

c. Soil moisture has deviated from what is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. Strong evidence of soil desiccation, oxidation or subsidence is observed.

d. Soil erosion or deposition patterns are strongly atypical and indicative of alterations in flow rates or points of discharge.

e. Fire history evidence indicates that fire frequency or severity may be much more than expected for the type of system being evaluated, possibly due to dryness.

f. Vegetation or benthic community zonation in most strata is inappropriate for the type of system being evaluated, indicating atypical hydrologic conditions.

g. Vegetation has strong evidence of greater than normal mortality, leaning or fallen trees, thinning canopy or signs of insect damage or disease associated with hydrologic stress.

h. Presence or evidence of use by animal species with specific hydrologic requirements is greatly reduced from expected or those species present have more generalized hydrologic requirements.

i. Much of the plant community composition consists of species tolerant of and associated with moderate water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.

j. Direct observation of standing water indicates moderate water quality degradation such as discoloration, turbidity, or oil sheen.

k. Existing water quality data indicates moderate deviation from normal for parameters such as salinity or nutrient loading, so that ecological effects would be expected.

l. Water depth, wave energy, currents and light penetration are not well suited for the type of community being evaluated and are expected to cause significant changes in species, age classes and densities.

4. A score of (0) means that the hydrology and water quality does not support the functions and provides no benefits to fish and wildlife. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

a. Water levels and flows exhibit an extreme degree of deviation from what is appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.

b. Water level indicators are not present or are greatly inconsistent with expected hydrologic conditions for the type of system being evaluated.

c. Soil moisture has deviated from what is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. Strong evidence of substantial soil desiccation, oxidation or subsidence is observed.

d. Soil erosion or deposition patterns are greatly atypical or indicative of greatly altered flow rates or points of discharge.

e. Fire history indicates great deviation from typical fire frequency or severity, due to extreme dryness.

f. Vegetation or benthic community zonation in all strata is inappropriate for the type of system being evaluated, indicating atypical hydrologic conditions.

g. Vegetation has strong evidence of much greater than normal mortality, leaning or fallen trees, thinning canopy or signs of insect damage or disease which may be associated with hydrologic stress.

h. Presence or evidence of use by animal species with specific hydrologic requirements is lacking and those species present have generalized hydrologic requirements.

i. The plant community composition consists predominantly of species tolerant of and associated with highly degraded water or alterations in frequency, depth, and duration in inundation or saturation.

j. Direct observation of standing water indicates significant water quality degradation such as obvious discoloration, turbidity, or oil sheen.

k. Existing water quality data indicates large deviation from normal for parameters such as salinity or nutrient loading, so that adverse ecological effects would be expected.

l. Water depth, wave energy, currents and light penetration are inappropriate for the type of community (species, age classes and densities) being evaluated.

(c) Community Structure – Each impact and mitigation assessment area is evaluated with regard to its characteristic community structure. In general, a wetland or other surface water is characterized either by plant cover or by open water with a submerged benthic community. Wetlands and surface waters characterized by plant cover will be scored according to subparagraph 62-345.500(6)(c)1., F.A.C., while benthic communities will be assessed in accordance with subparagraph 62-345.500(6)(c)2., F.A.C. If the assessment area is a mosaic of relatively equal parts of submerged plant cover and a submerged benthic community, then both of these indicators will be scored and those scores averaged to obtain a single community structure score.

1. Vegetation and structural habitat – The presence, abundance, health, condition, appropriateness, and distribution of plant communities in surface waters, wetlands, and uplands can be used as indicators to determine the degree to which the functions of the community type identified are provided. Vegetation is the base of the food web in any community and provides many additional structural habitat benefits to fish and wildlife. In forested systems, for example, the vertical structure of trees, tree cavities, standing dead snag, and fallen logs provide forage, nesting, and cover habitat for wildlife. Topographic features, such as flats, deeper depressions, hummocks, or tidal creeks also provide important structure for fish and wildlife habitat. Overall condition of a plant community can often be evaluated by observing indicators such as dead or dying vegetation, regeneration and recruitment, size and

age distribution of trees and shrubs, fruit production, chlorotic or spindly plant growth, structure of the vegetation strata, and the presence, coverage and distribution of inappropriate plant species. Human activities such as mowing, grazing, off-road vehicle activity, boat traffic, and fire suppression constitute more direct and easily observable impacts affecting the condition of plant communities. Although short-term environmental factors such as excessive rainfall, drought, and fire can have temporary impacts, human activities such as flooding, drainage via groundwater withdrawal and conveyance canals, or construction of permanent structures such as seawalls in an aquatic system can permanently damage these systems. The plant community should be evaluated to consider whether natural successional patterns for the community type are permanently altered. Inappropriate plants, including invasive exotic species, other invasive species, or other species atypical of the community type being evaluated, do not support the functions attributable to that community type and can out-compete and replace native species. Native upland and wetland vegetation, such as wax myrtle, pines and willow, which are not typically considered as invasive, can occur in numbers and coverage not appropriate for the community type and can serve as indicators of disturbance. The relative degree of coverage by inappropriate species, inappropriate vegetation strata, condition of vegetation, and both biotic and abiotic structure all provide an indication of the degree to which the functions anticipated for the community type identified are being provided.

a. A score of (10) means that the vegetation community and physical structure provide conditions which support an optimal level of function to benefit fish and wildlife utilizing the assessment area as listed in Part I. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- I. All or nearly all of the plant cover is by appropriate and desirable plant species in the canopy, shrub, or ground stratum.
- II. Invasive exotic or other invasive plant species are not present.
- III. There is strong evidence of normal regeneration and natural recruitment.
- IV. Age and size distribution is typical of the system, with no indication of deviation from normal successional or mortality pattern.
- V. The density and quality of coarse woody debris, snag, den, and cavity provide optimal structural habitat for that type of system.
- VI. Plants are in good condition, with very little to no evidence of chlorotic or spindly growth or insect damage.
- VII. Land management practices are optimal for long term viability of the plant community.
- VIII. Topographic features, such as refugia ponds, creek channels, flats or hummocks, are present and normal for the area being assessed.
- IX. If submerged aquatic plant communities are present, there is no evidence of siltation or algal growth that would impede normal aquatic plant growth.
- X. If an upland mitigation assessment area, the plant community and physical structure provide an optimal level of habitat and life history support for fish and wildlife in the associated wetlands or other surface waters.

b. A score of (7) means that the level of function provided by plant community and physical structure is limited to 70% of the optimal level. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- I. Majority of plant cover is by appropriate and desirable plant species in the canopy, shrub, or ground stratum.
- II. Invasive exotic or other invasive plant species are present, but cover is minimal.
- III. There is evidence of near-normal regeneration or natural recruitment.
- IV. Age and size distribution approximates conditions typical of that type of system, with no indication of permanent deviation from normal successional or mortality pattern, although there may have been temporary deviations or impacts to age and size distribution.
- V. Coarse woody debris, snags, dens, and cavities have either slightly lower than or slightly greater than normal quantity due to deviation from expected age structure or land management.
- VI. Plant condition is generally good condition, with little evidence of chlorotic or spindly growth or insect damage.
- VII. Land management practices are generally appropriate, but there may be some fire suppression or water control features that have caused a shift in the plant community.
- VIII. Topographic features, such as refugia ponds, creek channels, flats or hummocks, are slightly less than optimal for the area being assessed.
- IX. In submerged aquatic plant communities, there is a minor degree of siltation or algal growth that would impede normal aquatic plant growth.
- X. If an upland mitigation assessment area, the plant community and physical structure provide high, but less than optimal, level of habitat and life history support for fish and wildlife in the associated wetlands or other surface waters.

c. A score of (4) means that the level of function provided by the plant community and physical structure is limited to 40% of the optimal level. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

- I. Majority of plant cover is by inappropriate or undesirable plant species in the canopy, shrub, or ground stratum.
- II. Majority of the plant cover and presence is comprised of invasive exotic or other invasive plant species.
- III. There is minimal evidence of regeneration or natural recruitment.
- IV. Age and size distribution is atypical of the system and indicative of permanent deviation from normal successional pattern, with greater than expected amount of dead or dying vegetation.

V. Coarse woody debris, snags, dens, and cavities are either not present or greater than normal because the native vegetation is dead or dying.

VI. Generally poor plant condition, such as chlorotic or spindly growth or insect damage.

VII. Land management practices have resulted in partial removal or alteration of natural structures or introduction of some artificial features, such as furrows or ditches.

VIII. Reduction in extent of topographic features, such as refugia ponds, creek channels, flats or hummocks, from what is normal for the area being assessed.

IX. In submerged aquatic plant communities, there is a moderate degree of siltation or algal growth.

X. If an upland mitigation assessment area, the plant community and physical structure provide moderate level of habitat and life history support for fish and wildlife in the associated wetlands or other surface waters.

d. A score of (0) means that the vegetation communities and structural habitat do not provide functions to benefit fish and wildlife. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

I. No appropriate or desirable plant species in the canopy, shrub, or ground stratum.

II. High presence and cover by invasive exotic or other invasive plant species.

III. There is no evidence of regeneration or natural recruitment.

IV. High percentage of dead or dying vegetation, with no typical age and size distribution.

V. Coarse woody debris, snags, dens, and cavities are either not present or exist only because the native vegetation is dead or dying.

VI. Overall very poor plant condition, such as highly chlorotic or spindly growth or extensive insect damage.

VII. Land management practices have resulted in removal or alteration of natural structure or introduction of artificial features, such as furrows or ditches.

VIII. Lack of topographic features such as refugia ponds, creek channels, flats or hummocks, that are normal for the area being assessed.

IX. In submerged aquatic plant communities, there is a high degree of siltation or algal growth.

X. If an upland mitigation assessment area, the plant community and physical structure provide little or no habitat and life history support for fish and wildlife in the associated wetland or other surface waters.

2. Benthic Communities – This indicator is intended to be used in marine or freshwater aquatic systems that are not characterized by a plant community, and is not intended to be used in wetlands that are characterized by a plant community. The benthic communities within nearshore, inshore, marine and freshwater aquatic systems are analogous to the vascular plant communities of terrestrial wetland systems in that they provide food and habitat for other biotic components of the system and function in the maintenance of water quality. For example, oyster bars and beds in nearshore habitats and estuaries filter large amounts of particulate matter and provide food and habitat for a variety of species, such as boring sponges, mollusks, and polychaete worms. Live hardbottom community composition varies with water depths and substratum, but this community type contributes to the food web, as well as providing three-dimensional structure through the action of reef-building organisms and rock-boring organisms and water quality benefits from filter-feeding organisms. The distribution and quality of coral reefs reflect a balance of water temperature, salinity, nutrients, water quality, and presence of nearby productive mangrove and seagrass communities. Coral reefs contribute to primary productivity of the marine environment as well as creating structure and habitat for a large number of organisms. Even benthic infauna of soft-bottom systems stabilize the substrate, provide a food source, and serve as useful indicators of water quality. All of these communities are susceptible to human disturbance through direct physical damage, such as dredging, filling, or boating impacts, and indirect damage through changes in water quality, currents, and sedimentation.

a. A score of (10) means that the benthic communities are indicative of conditions that provide optimal support for all of the functions typical of the assessment area and provide optimal benefit to fish and wildlife. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

I. The appropriate species number and diversity of benthic organisms are optimal for the type of system.

II. Non-native or inappropriate species are not present and the site is not near an area with such species.

III. Natural regeneration, recruitment, and age distribution are optimal.

IV. Appropriate species are in good condition, with typical biomass.

V. Structural features are typical of the system with no evidence of past physical damage.

VI. Topographic features, such as relief, stability, and interstitial spaces for hardbottom and reef communities or snags and coarse woody debris in riverine systems, are typical of that type of habitat and optimal for the benthic community being evaluated.

VII. Spawning or nesting habitats, such as rocky or sandy bottoms, are optimal for the community type.

b. A score of (7) means that, relative to ideal habitat, the benthic communities of the assessment area provide functions at 70% of the optimal level. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:

I. Majority of the community is composed of appropriate species; the number and diversity of benthic organisms slightly less than typical.

II. Any non-native or inappropriate species present represent a minority of the community or the site is immediately adjacent to an area with such species.

- III. Natural regeneration or recruitment is slightly less than expected.
- IV. Appropriate species are in generally good condition, with little reduction in biomass from what is optimal.
- V. Structural features are close to that typical of the system, or little evidence of past physical damage.
- VI. Topographic features, such as relief, stability, and interstitial spaces for hardbottom and reef communities or snags and coarse woody debris in riverine systems, indicate slight deviation from what is expected and is less than optimal for the benthic community being evaluated.
- VII. Spawning or nesting habitats, such as rocky or sandy bottoms, are less than expected.
- c. A score of (4) means that, relative to ideal habitat, the benthic communities of the assessment area provide functions to 40% of the optimal level. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:
 - I. Appropriate species number or diversity of benthic organisms is greatly decreased from typical.
 - II. Majority of species present is non-native or inappropriate species or the site is immediately adjacent to an area heavily infested by such species.
 - III. Natural regeneration or recruitment is minimal.
 - IV. Substantial number of appropriate species are dying or in poor condition, resulting in much lower than normal biomass.
 - V. Structural features are atypical of the system, or there is evidence of great or long term physical damage.
 - VI. Topographic features, such as relief, stability, and interstitial spaces for hardbottom and reef communities or snags and coarse woody debris in riverine systems, are greatly reduced from what is expected and is not appropriate for the benthic community being evaluated.
 - VII. Few spawning or nesting habitats, such as rocky or sandy bottoms, are available.
- d. A score of (0) means that the benthic communities do not support the functions identified and do not provide benefits to fish and wildlife. The score is based on reasonable scientific judgment and characterized by a predominance of the following, as applicable:
 - I. Lack of appropriate species and diversity of those species; any appropriate species present are in poor condition.
 - II. Non-native or inappropriate species are dominant.
 - III. There is no indication of natural regeneration or recruitment.
 - IV. Structural integrity is very low or non-existent, or there is evidence of serious physical damage.
 - V. Topographic features, such as relief, stability, and interstitial spaces for hardbottom and reef communities or snags and coarse woody debris in riverine systems, are lacking.
 - VI. No spawning or nesting habitats, such as rocky or sandy bottoms, are present.
- (7) The Part II score for an impact, wetland, or surface water mitigation assessment area shall be determined by summing the scores for each of the indicators and dividing that value by 30 to yield a number between 0 and 1. For upland mitigation assessment areas, the Part II score shall be determined by summing the scores for the location and community structure indicators and dividing that value by 20 to yield a number between 0 and 1.

Specific Authority 373.026(7), 373.043, 373.414(9), (18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.600 Time Lag, Risk, and Mitigation Determination.

- (1) Time lag shall be incorporated into the gain in ecological value of the proposed mitigation as follows:
 - (a) The time lag associated with mitigation means the period of time between when the functions are lost at an impact site and when those functions are replaced by the mitigation. In general, the time lag varies by the type and timing of mitigation in relation to the impacts. Wetland creation generally has a greater time lag to establish certain wetland functions than most enhancement activities. Forested systems typically require more time to establish characteristic structure and function than most herbaceous systems. Factors to consider when assigning time lag include biological, physical, and chemical processes associated with nutrient cycling, hydric soil development, and community development and succession. There is no time lag if the mitigation fully offsets the anticipated impacts prior to or at the time of impact.
 - (b) The time lag factor under this section shall be scored as 1 when evaluating mitigation for proposed phosphate and heavy mineral mining activities in accordance with this rule to determine compliance with Section 373.414(6)(b), F.S.
 - (c) For the purposes of this rule, the time lag, in years, is related to a factor (T-factor) as established in Table 1 below, to reflect the additional mitigation needed to account for the deferred replacement of wetland or surface water functions.
 - (d) The “Year” column in Table 1 represents the number of years between the time the wetland impacts are anticipated to occur and the time when the mitigation is anticipated to fully offset the impacts, based on reasonable scientific judgment of the proposed mitigation activities and the site specific conditions.

TABLE 1.	
Year	T-factor
< or = 1	1
2	1.03
3	1.07
4	1.10
5	1.14
6-10	1.25
11-15	1.46
16-20	1.68
21-25	1.92
26-30	2.18
31-35	2.45
36-40	2.73
41-45	3.03
46-50	3.34
51-55	3.65
>55	3.91

(2) Mitigation risk shall be evaluated to account for the degree of uncertainty that the proposed conditions will be achieved, resulting in a reduction in the ecological value of the mitigation assessment area. In general, mitigation projects which require longer periods of time to replace lost functions or to recover from potential perturbations will be considered to have higher risk than those which require shorter periods of time. The assessment area shall be scored on a scale from 1 (for no or *de minimus* risk) to 3 (high risk), on quarter-point (0.25) increments. A score of one would most often be applied to mitigation conducted in an ecologically viable landscape and deemed successful or clearly trending towards success prior to impacts, whereas a score of three would indicate an extremely low likelihood of success based on the ecological factors below. A single risk score shall be assigned, considering the applicability and relative significance of the factors below, based upon consideration of the likelihood and the potential severity of reduction in ecological value due to these factors.

(a) The vulnerability of the mitigation to and the extent of the effect of different hydrologic conditions than those proposed, considering the degree of dependence on mechanical or artificial means to achieve proposed hydrologic conditions, such as pumps or adjustable weirs, effects of water withdrawals, diversion or drainage features, reliability of the hydrologic data, modeling, and design, unstable conditions due to waves, wind, or currents, and the hydrologic complexity of the proposed community. Systems with relatively simple and predictable hydrology, such as tidal wetlands, would entail less risk than complex hydrological systems such as seepage slopes or perched wetlands;

(b) The vulnerability of the mitigation to the establishment and long-term viability of plant communities other than that proposed, and the potential reduction in ecological value which might result, considering the compatibility of the site soils and hydrologic conditions with the proposed plant community, planting plans, and track record for community or plant establishment method;

(c) The vulnerability of the mitigation to colonization by invasive exotic or other invasive species, considering the location of recruitment sources, the suitability of the site for establishment of these species, the degree to which the functions provided by plant community would be affected;

(d) The vulnerability of the mitigation to degraded water quality, considering factors such as current and future adjacent land use, and construction, operation, and maintenance of surface water treatment systems, to the extent that ecological value is affected by these changes;

(e) The vulnerability of the mitigation to secondary impacts due to its location, considering potential land use changes in surrounding area, existing protection provided to surrounding areas by easements, restrictive covenants, or federal, state, or local regulations, and the extent to which these factors influence the long term viability of functions provided by the mitigation site; and

(f) The vulnerability of the mitigation to direct impacts, considering its location and existing and proposed protection provided to the mitigation site by easements, restrictive covenants, or federal, state, or local regulations, and the extent to which these measures influence the long term viability of the mitigation site.

(3) The relative gain of functions provided by a mitigation assessment area must be adjusted for time lag and risk using the following formula: Relative functional gain (RFG) = Mitigation Delta (or adjusted mitigation delta for preservation)/(risk x t-factor). The loss of functions provided by impact assessment areas is determined using the following formula: Functional loss (FL) = Impact Delta x Impact Acres.

(a) To determine the number of potential mitigation bank credits a bank or regional offsite mitigation area can provide, multiply the relative functional gain (RFG) times the acres of the mitigation bank or regional offsite mitigation assessment area scored. The total amount of credits is the summation of the potential RFG for each assessment area.

(b) To determine the number of mitigation bank credits or amount of regional offsite mitigation needed to offset impacts, when the bank or regional offsite mitigation area is assessed in accordance with this rule, calculate the functional loss (FL) of each impact assessment area. The total number of credits required is the summation of the calculated functional loss for each impact assessment area. Neither time lag nor risk is applied to determining the number of mitigation bank credits or amount of mitigation necessary to offset impacts when the bank or regional offsite mitigation area has been assessed under this rule.

(c) To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there is more than one impact assessment area or more than one mitigation assessment area, the total functional loss and total relative functional gain is determined by summation of the functional loss and relative functional gain for each assessment area.

Specific Authority 373.026(7), 373.043, 373.414(9), 373.414(18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

62-345.900 Forms.

The forms used for the Uniform Mitigation Assessment Method are adopted and incorporated by reference in this section. The forms are listed by rule number, which is also the form number, and with the subject title and effective date. Copies of these forms may be obtained by writing to the Department of Environmental Protection, Division of Water Resource Management, Bureau of Beaches and Wetland Resources, MS 2500, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, or any local district or branch office of the Department.

(1) Part I – Qualitative Description, 2-2-04.

(2) Part II – Quantification of Assessment Area (impact or mitigation), 2-2-04.

(3) Mitigation Determination Formulas, 2-2-04.

Specific Authority 373.026(7), 373.043, 373.414(9), 373.414(18) FS. Law Implemented 373.414(18) FS. History—New 2-2-04.

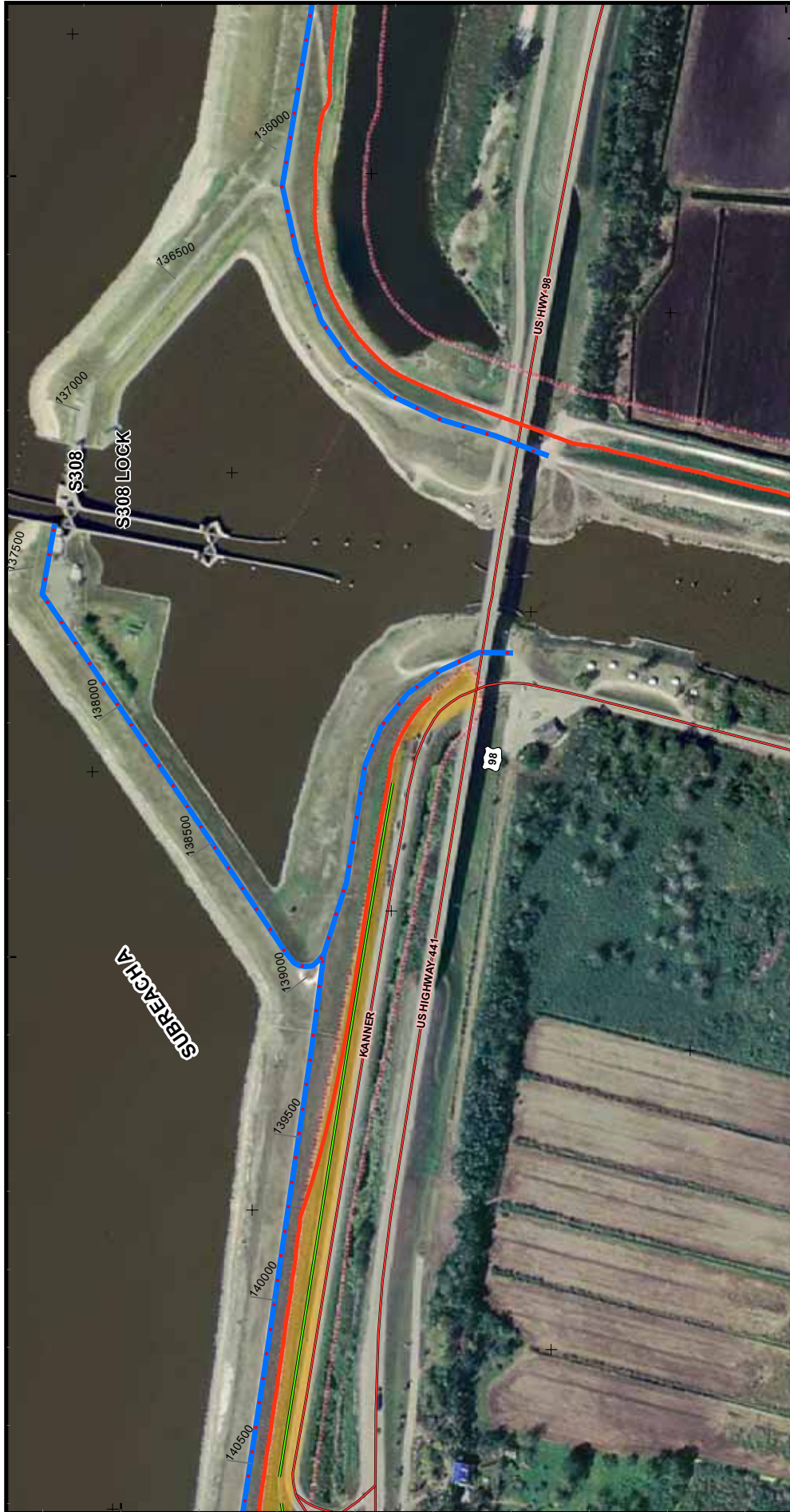
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C.4 HERBERT HOOVER DIKE REACH 1 MAPS

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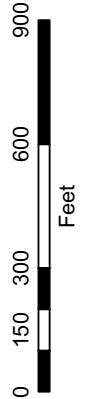


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HERBERT HOOVER DIKE Reach1 Sheet 1

Legend

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|----------------------|-------------------|-------------|
| 123000 | Stationing Number | Focus Areas |
| 150 Ft. Out from toe | Crest of Dike | Ownership |
| 150 Ft. Out from toe | Toe Ditch | ROW |
| 150 Ft. Out from toe | Toe of Dike | |



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781000

SUBREACH A

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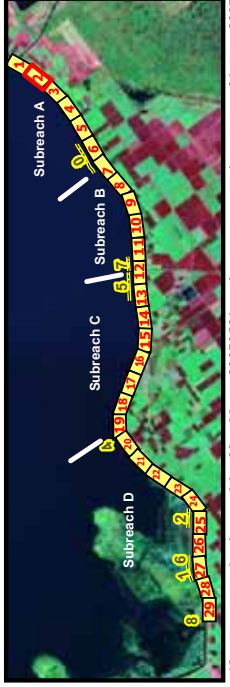
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KANAWA
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HERBERT HOOVER DIKE Reach1 Sheet 2

Legend

123000 Stationing Number

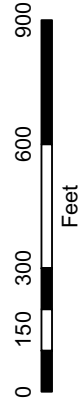
- Crest of Dike
- Toe Ditch
- Toe of Dike

Focus Areas

- 150 Ft. Out from toe
- Ownerships
- ROW

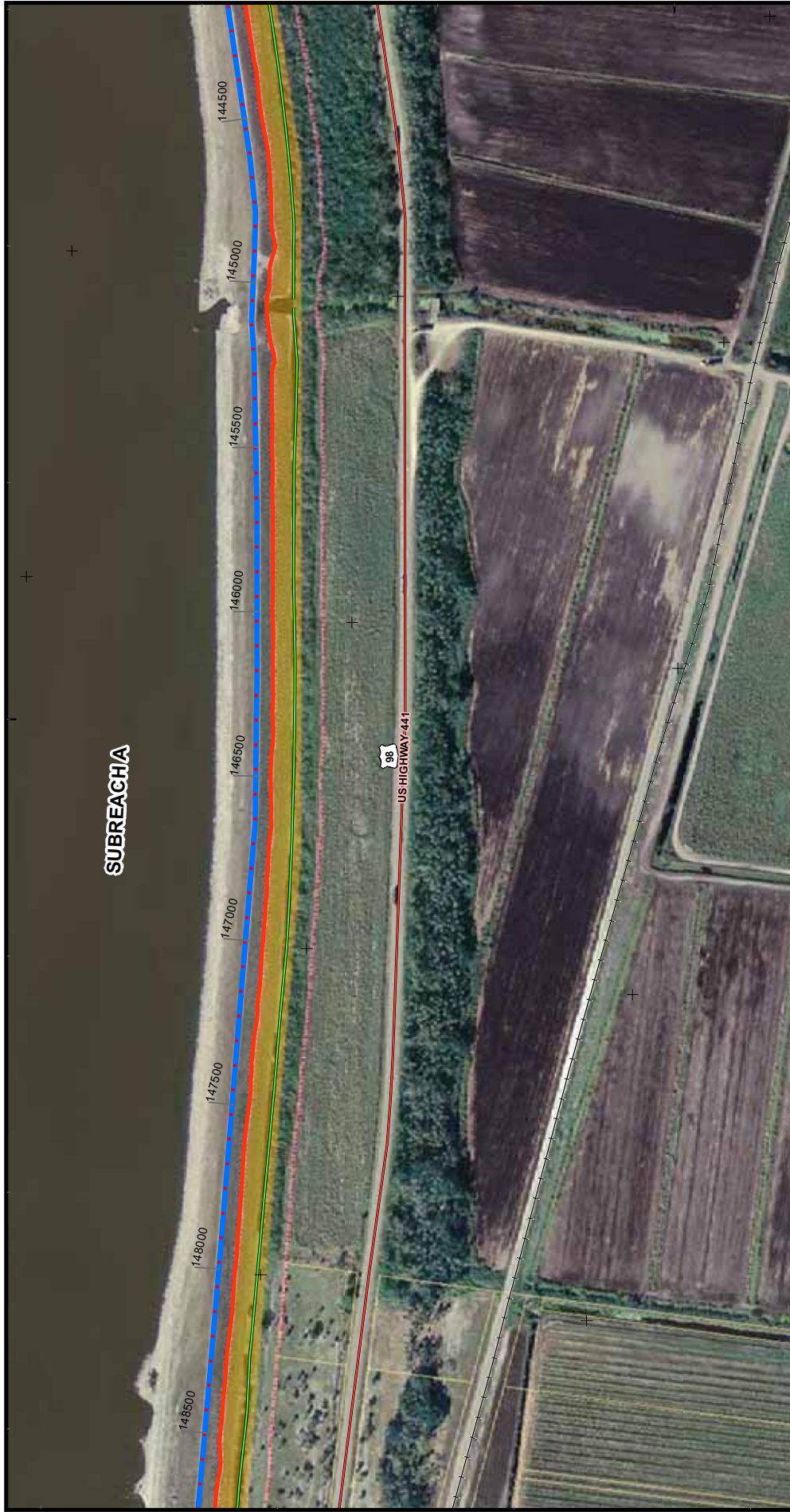


US Army Corps
of Engineers
Jacksonville District

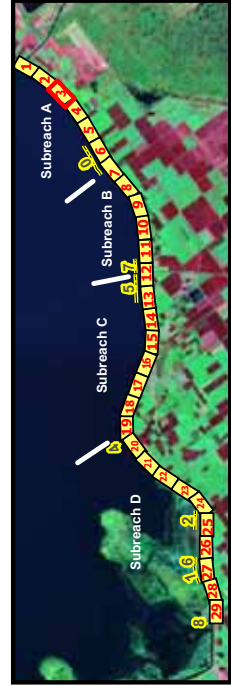


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HERBERT HOOVER DIKE Reach1 Sheet 3

Legend

123000 Stationing Number

- Crest of Dike
- Toe Ditch
- Toe of Dike

Focus Areas

- 150 Ft. Out from toe
- Ownerships
- ROW

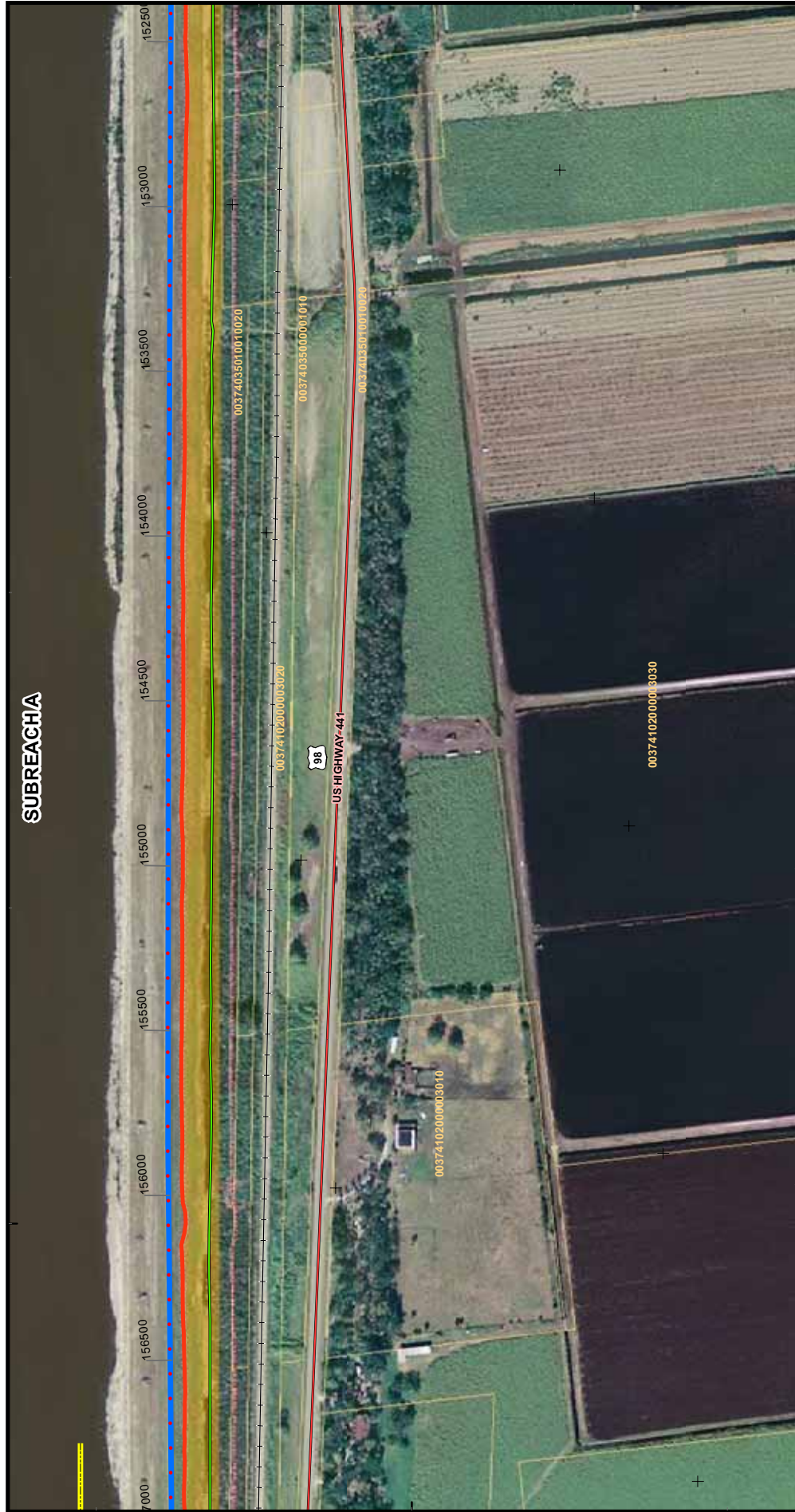


US Army Corps
of Engineers
Jacksonville District

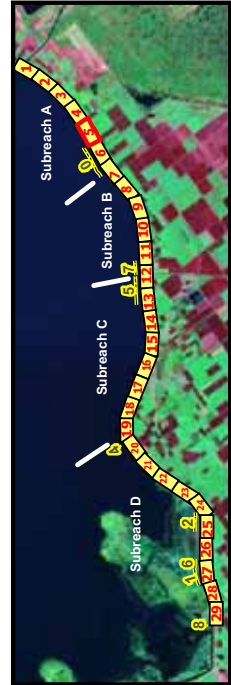


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HERBERT HOOVER DIKE Reach1 Sheet 5

Legend

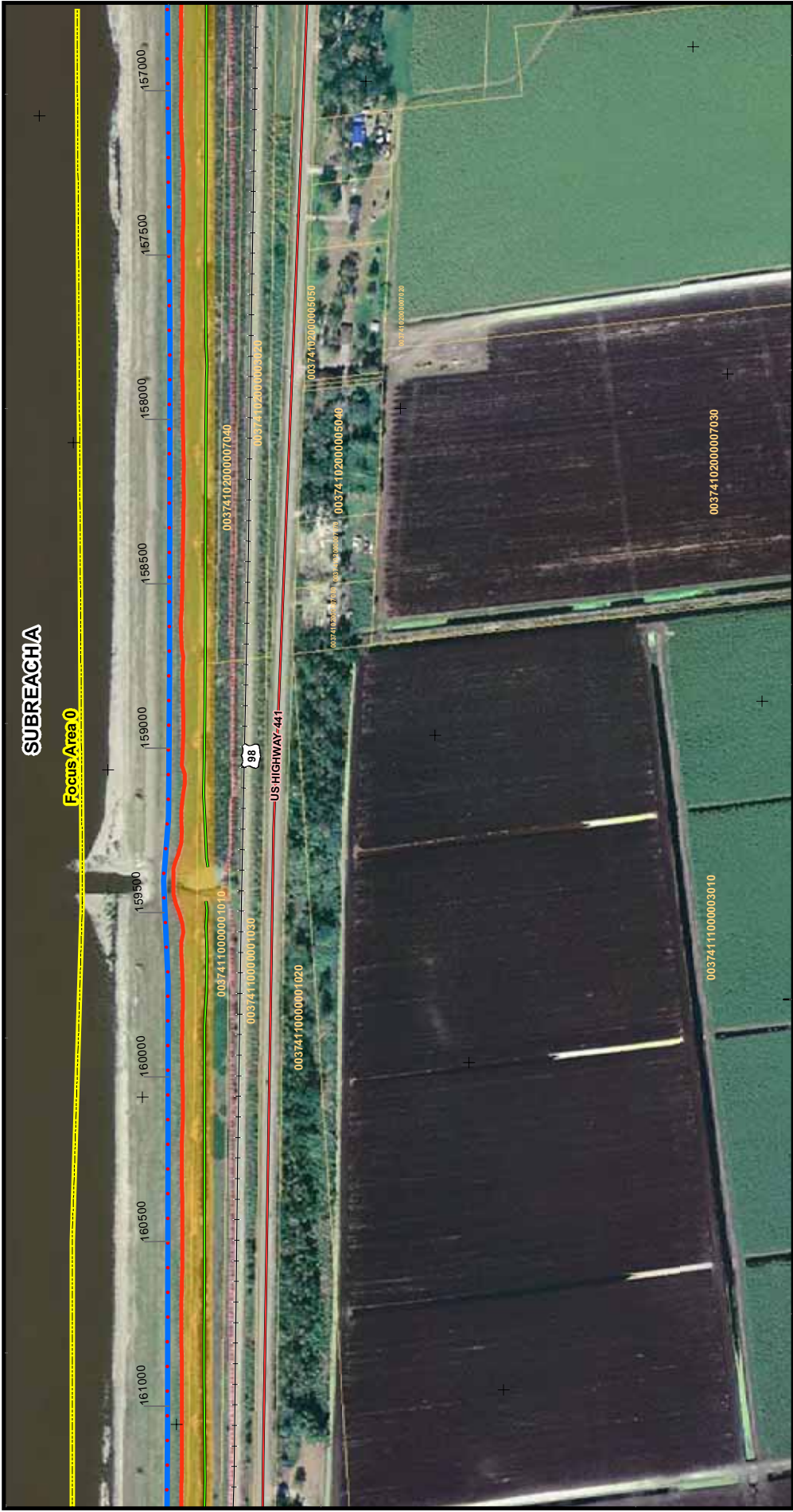
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- Crest of Dike
- Toe Ditch
- Toe of Dike
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW



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of Engineers
Jacksonville District



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File Name: mapbook_reach1_all_offsets20070501.mxd Print Date: 01 May 2007

Legend

123000 Stationing Number

Focus Areas

150 Ft. Out from toe

Ownerships

ROW

Crest of Dike

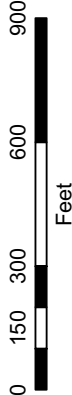
Toe Ditch

Toe of Dike

US Army Corps of Engineers Jacksonville District

HERBERT HOOVER DIKE

Reach1 Sheet 6



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168500 168600 168700 168800 168900 169000 169100 169200 169300 169400 169500

US HWY 441

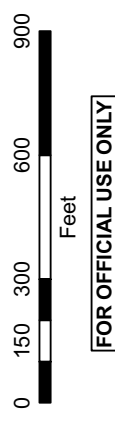
Legend

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—	Crest of Dike	—	Ownerships
—	Toe Ditch	—	ROW
—	Toe of Dike	—	

US Army Corps of Engineers
Jacksonville District

HERBERT HOOVER DIKE

Reach1 Sheet 8



781000

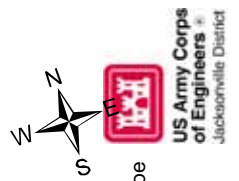
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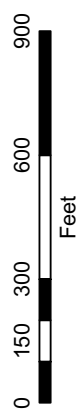
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Legend

- 123000 Stationing Number
- Crest of Dike
- Toe Ditch
- Toe of Dike
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW

HERBERT HOOVER DIKE Reach1 Sheet 9



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Print Date: 01 May 2007

779000

780000

781000



779000

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HERBERT HOOVER DIKE

Reach 1 Sheet 10

Stationing Number

123000

Focus Areas

150 Ft. Out from toe

Ownership

ROW

Legend

Stationing Number

123000

Focus Areas

150 Ft. Out from toe

Ownership

ROW

0 150 300 600 900

Feet

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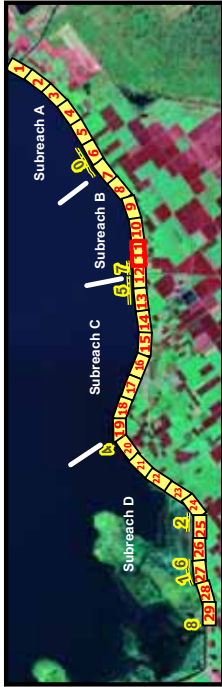


921000

HERBERT HOOVER DAM Reach 11 Sheet 11

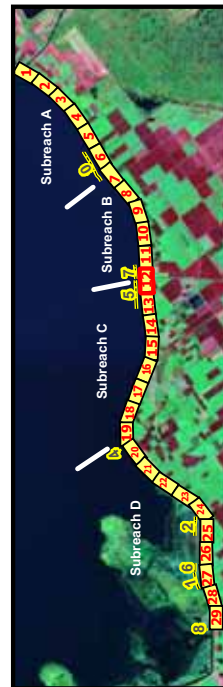
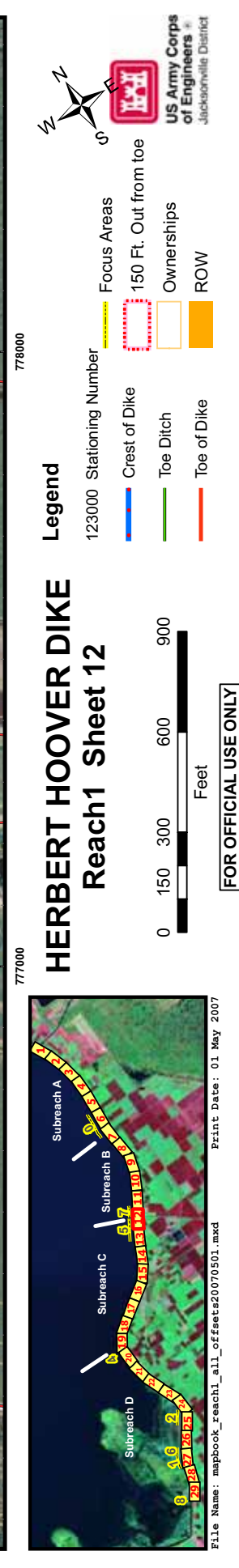
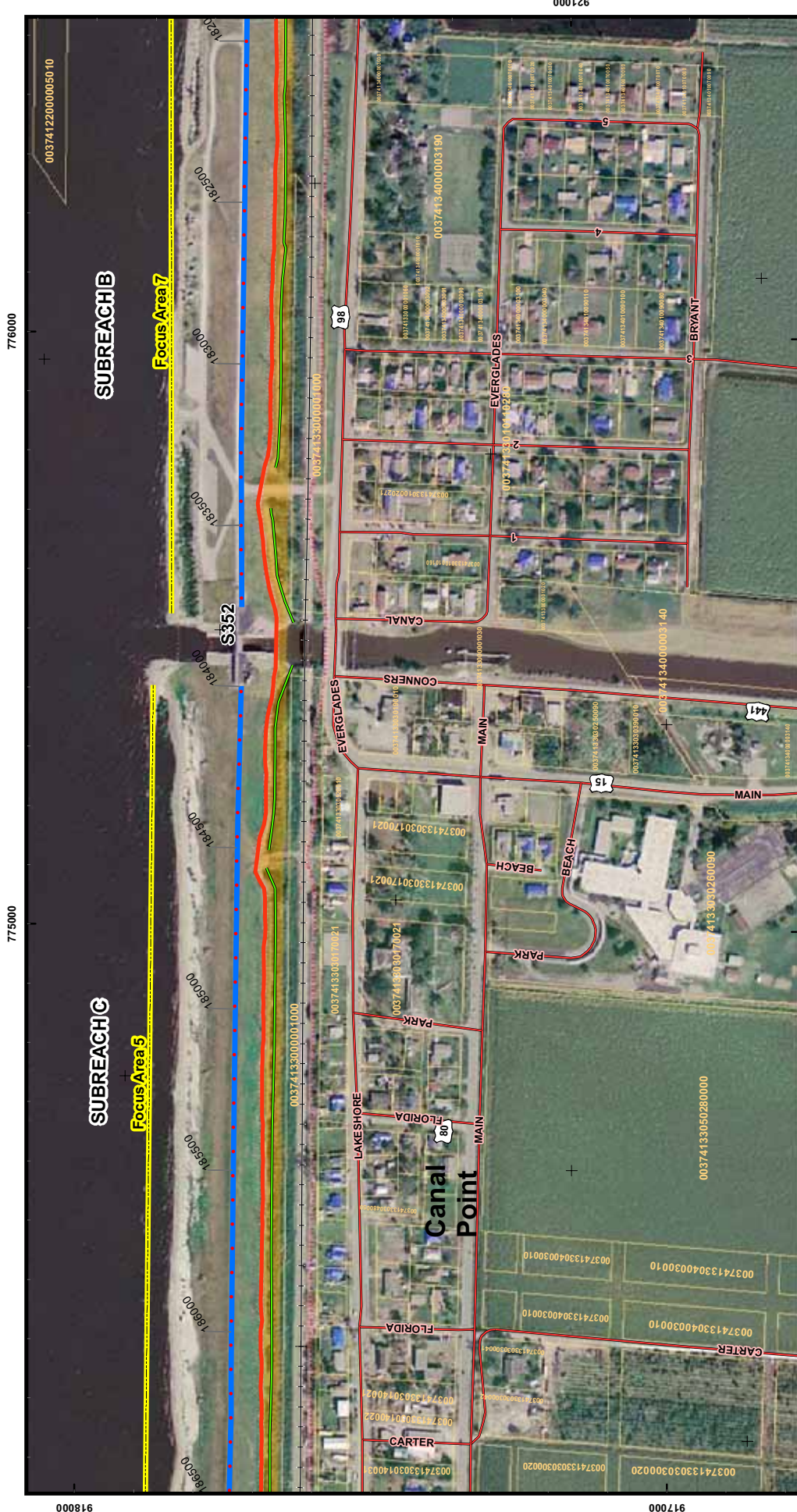


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Jacksonville District



774000

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SUBREACH C

Focus Area 5



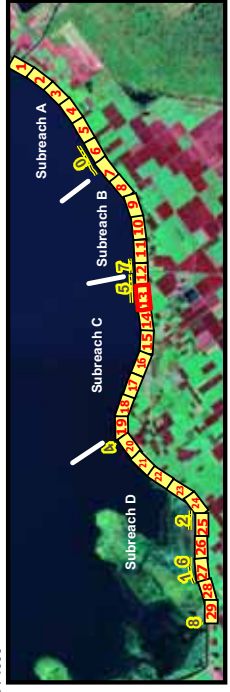
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HERBERT HOOVER DIKE Reach1 Sheet 13

Legend

123000 Stationing Number

Crest of Dike

Toe Ditch

Toe of Dike

Focus Areas

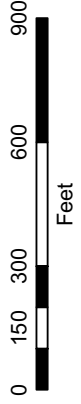
150 Ft. Out from toe

Ownerships

ROW



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Jacksonville District



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772000

771000

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00016

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HERBERT HOOVER DAM Reach1 Sheet 14

Legend

123000 Stationing Number

Crest of Dike

Toe Ditch

Toe of Dike

Focus Areas

150 Ft. Out from toe

Ownerships

ROW



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Jacksnville District



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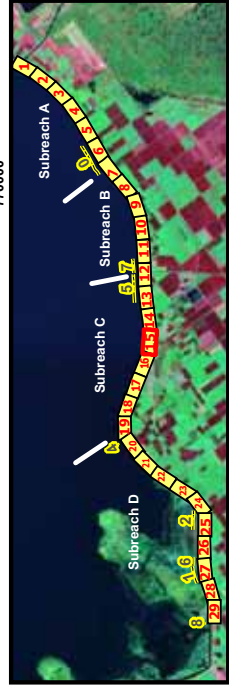
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770000

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772000



HERBERT HOOVER DIKE Reach1 Sheet 15

Legend

123000 Stationing Number

Crest of Dike

Toe Ditch

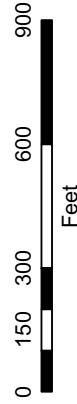
Toe of Dike

Focus Areas

150 Ft. Out from toe

Ownerships

ROW



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of Engineers
Jacksonville District

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207000 208000 209000 210000 211000 212000 213000 214000 215000 216000 217000 218000 219000 220000 221000 222000 223000 224000 225000 226000 227000 228000 229000 230000 231000 232000 233000 234000 235000 236000 237000 238000 239000 240000 241000 242000 243000 244000 245000 246000 247000 248000 249000 250000 251000 252000 253000 254000 255000 256000 257000 258000 259000 260000 261000 262000 263000 264000 265000 266000 267000 268000 269000 270000 271000 272000 273000 274000 275000 276000 277000 278000 279000 280000 281000 282000 283000 284000 285000 286000 287000 288000 289000 290000 291000 292000 293000 294000 295000 296000 297000 298000 299000 300000

SUBREACH C



HERBERT HOOVER DIKE

Reach1 Sheet 17

Stationing Number

123000

150 Ft. Out from toe

Focus Areas

150 Ft. Out from toe

Ownership

ROW

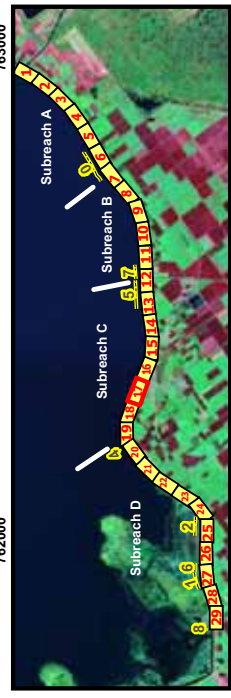
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Feet

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Jacksonville District



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Print Date: 01 May 2007



Legend

Stationing Number	Focus Areas
123000	150 Ft. Out from toe
Crest of Dike	Ownerships
Toe Ditch	ROW
Toe of Dike	

US Army Corps of Engineers
Jacksonville District

HERBERT HOOVER DIKE

Reach1 Sheet 18

0 150 300 600 900

Feet

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Legend

123000 Stationing Number

Crest of Dike

Toe Ditch

Toe of Dike

Focus Areas

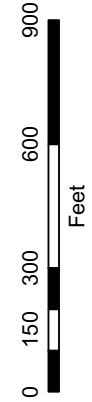
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Ownerships

ROW

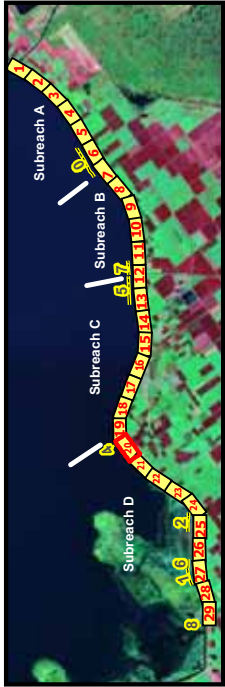
HERBERT HOOVER DIKE

Reach1 Sheet 19



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HERBERT HOOVER DAM Reach1 Sheet 20

Legend

- 123000 Stationing Number
- Crest of Dike
- Toe Ditch
- Toe of Dike
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW



Feet

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Jacksonville District

755000



757000

Legend

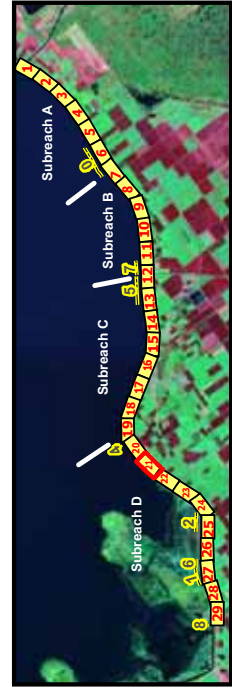
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	Crest of DiKE		150 Ft. Out from toe
	Toe Ditch		Ownerships
	Toe of DiKE		ROW

US Army Corps of Engineers
Jacksonville District

HERBERT HOOVER DIKE Reach1 Sheet 21



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756000



000588

759000

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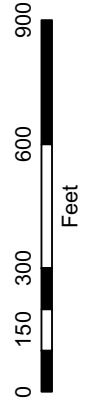


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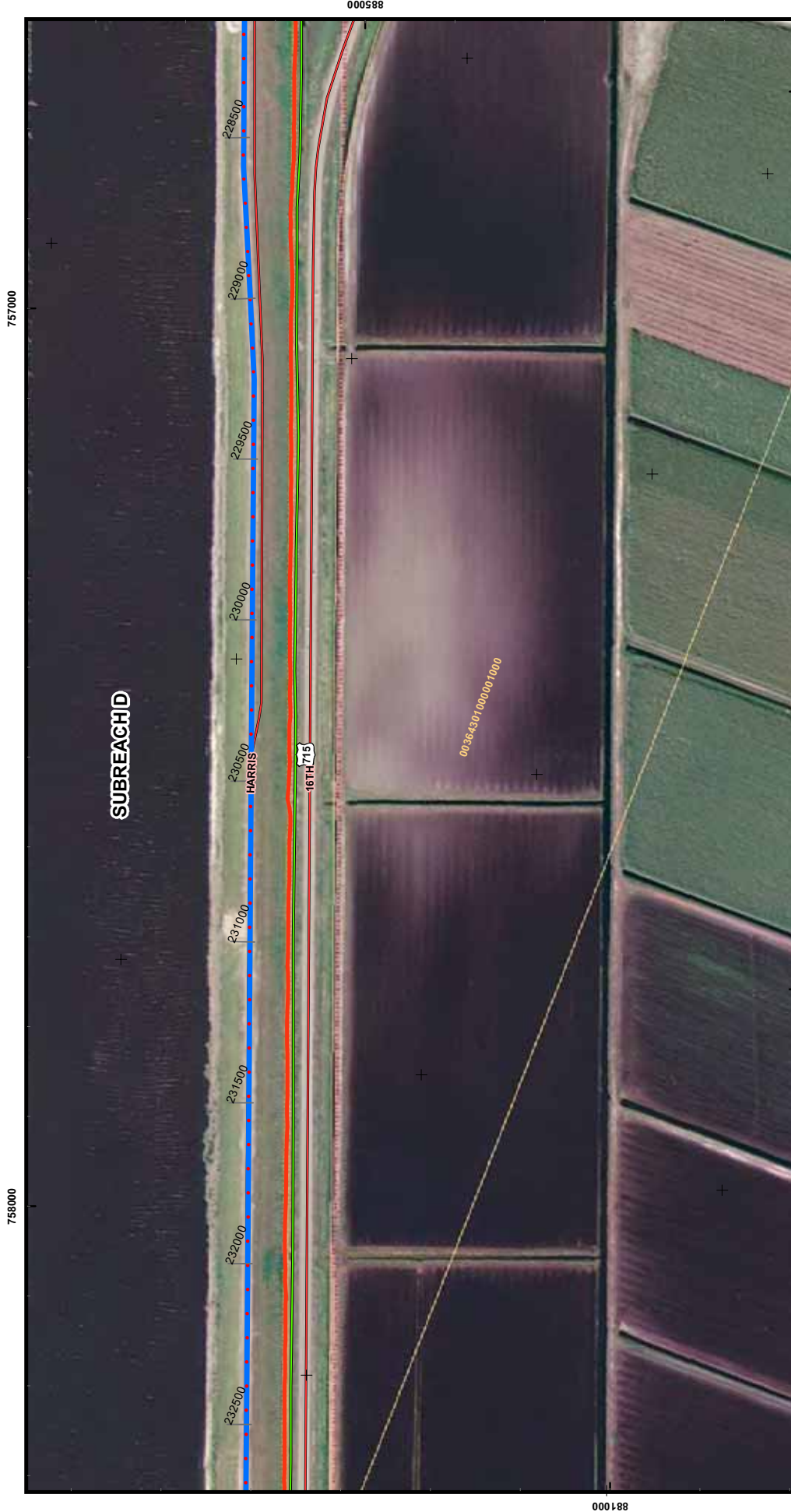
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- Crest of DiKE
- Toe Ditch
- Toe of DiKE
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW



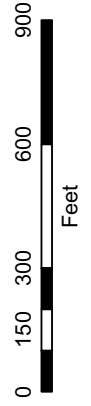
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of Engineers
Jacksonville District



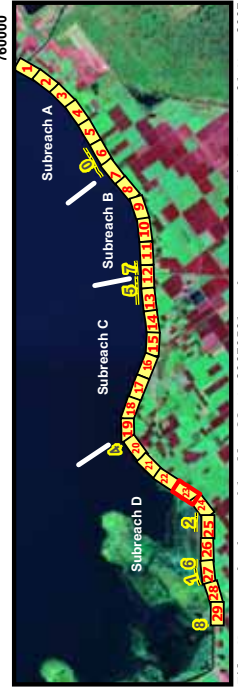
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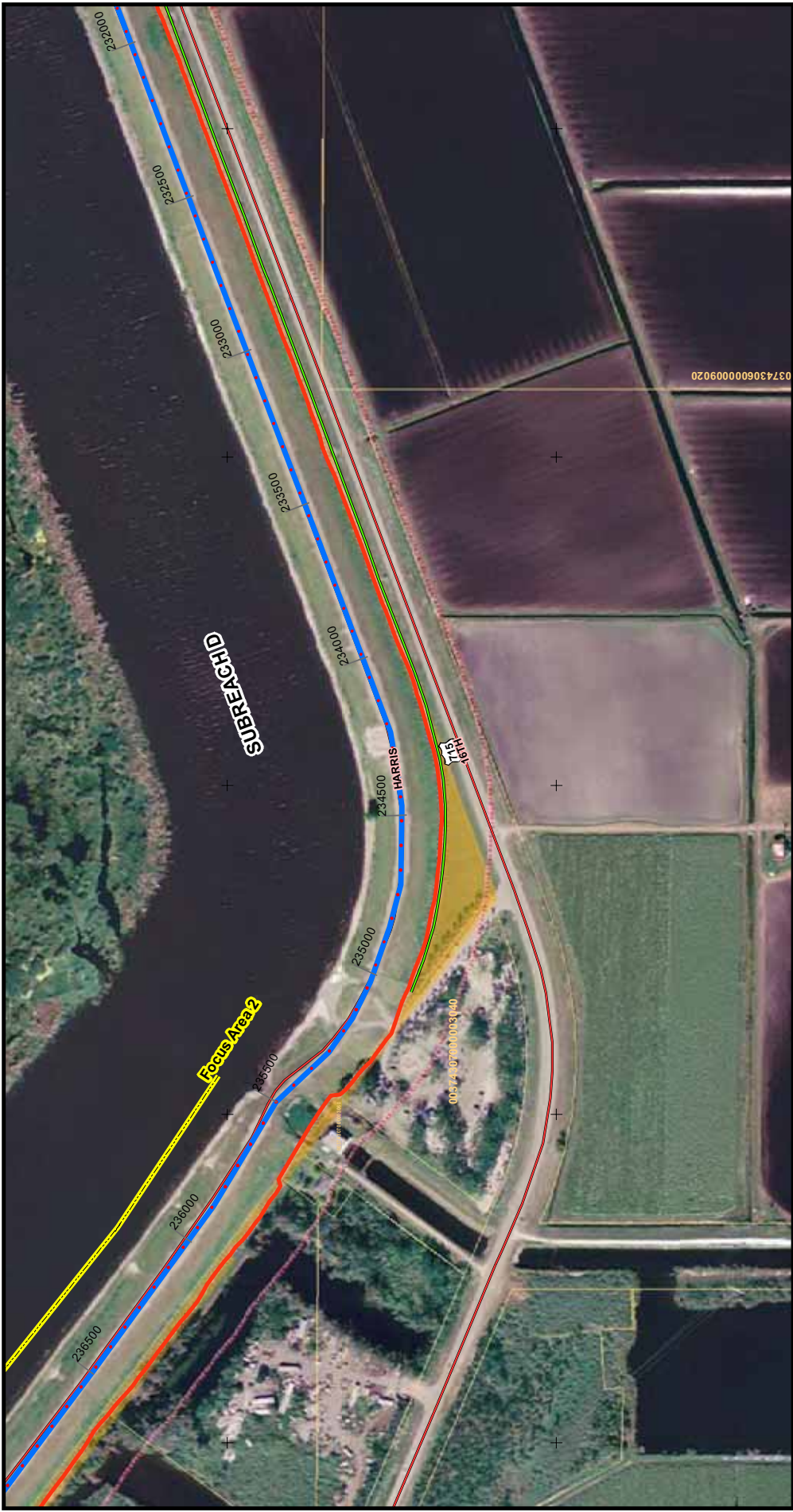
HERBERT HOOVER DIKE
Reach1 Sheet 23



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Print Date: 01 May 2007



HERBERT HOOVER DIKE

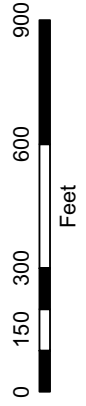
Reach1 Sheet 24

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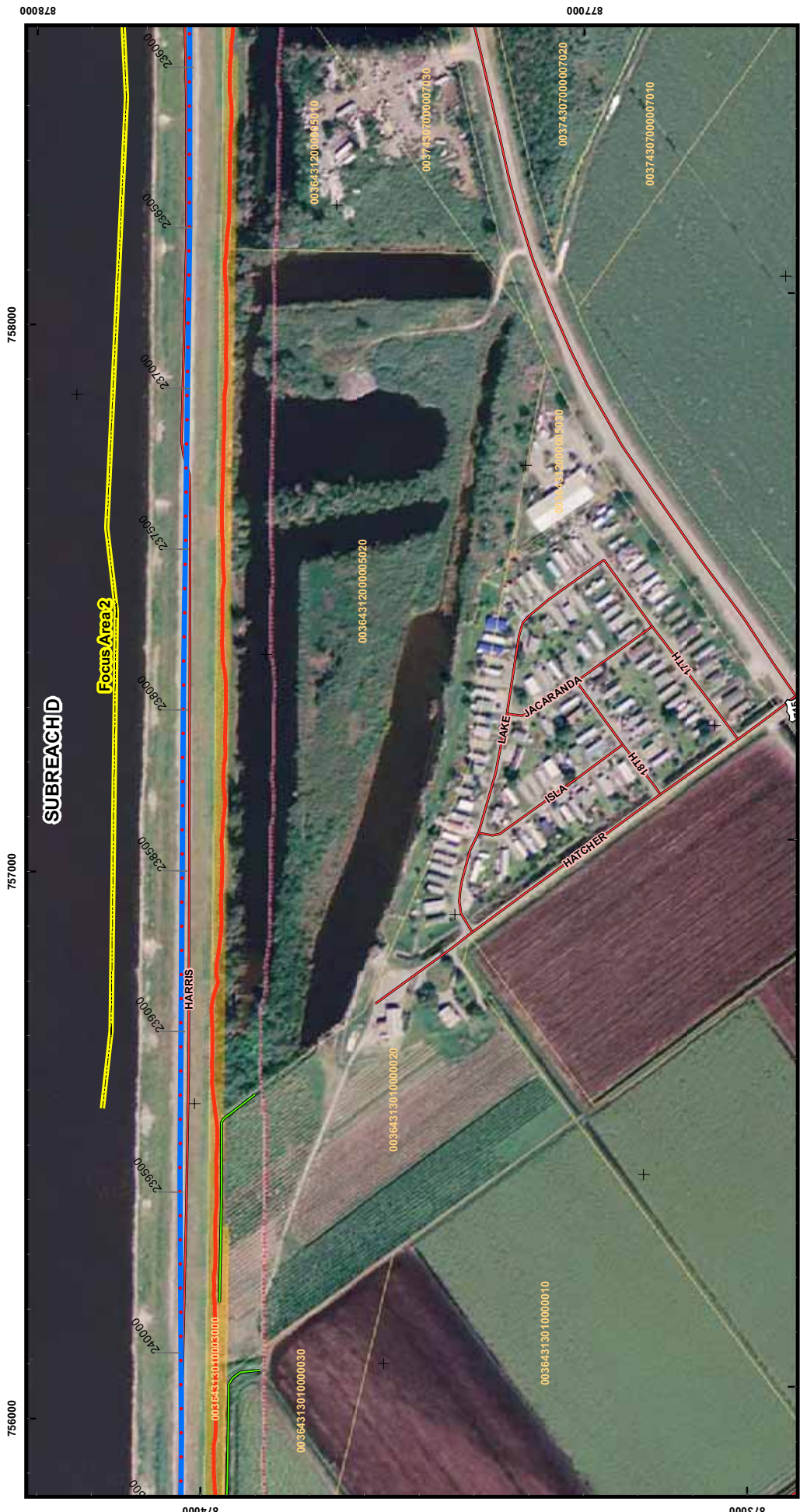
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- Crest of Dike
- Toe Ditch
- Toe of Dike
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW



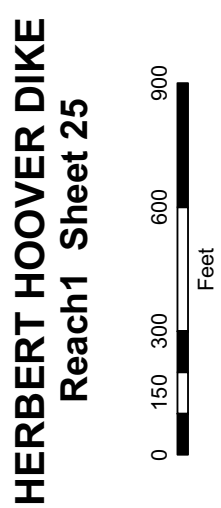
US Army Corps
of Engineers
Jacksonville District



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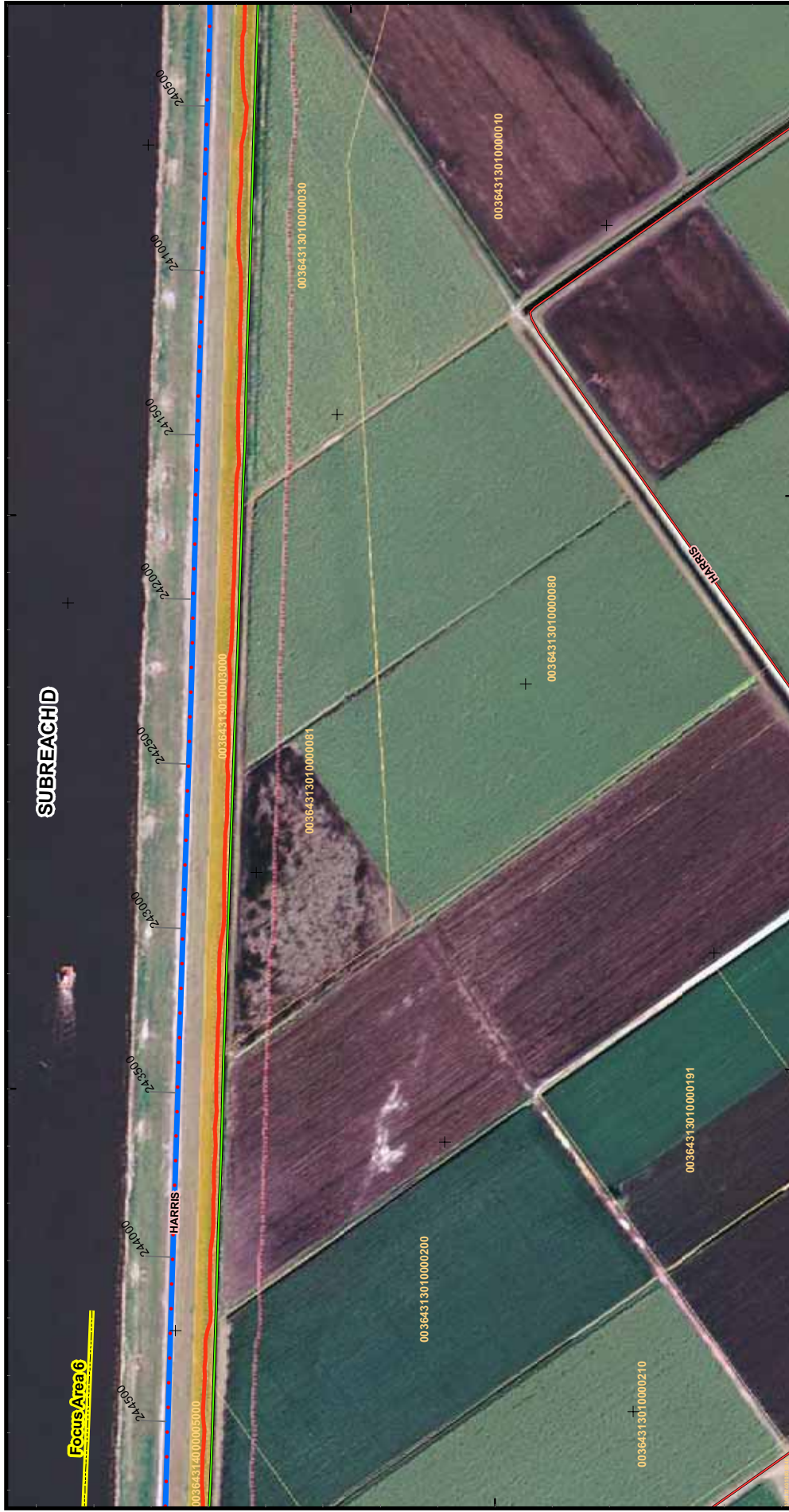


- Legend**
- Stationing Number: 123000
 - Crest of Dike: 150 Ft. Out from toe
 - Toe Ditch: Ownerships
 - Toe of Dike: ROW

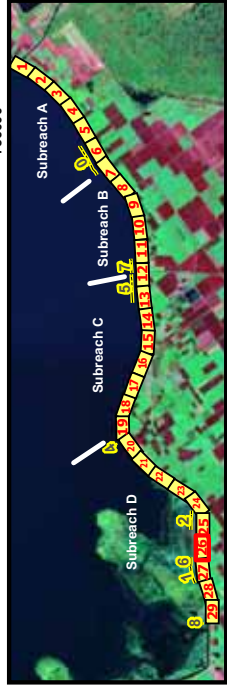


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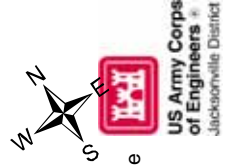
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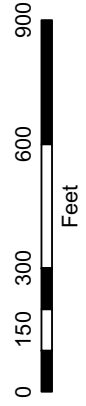
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Legend

- Stationing Number 123000
- Crest of Dike
- Toe Ditch
- Toe of Dike
- Focus Areas
- 150 Ft. Out from toe
- Ownerships
- ROW

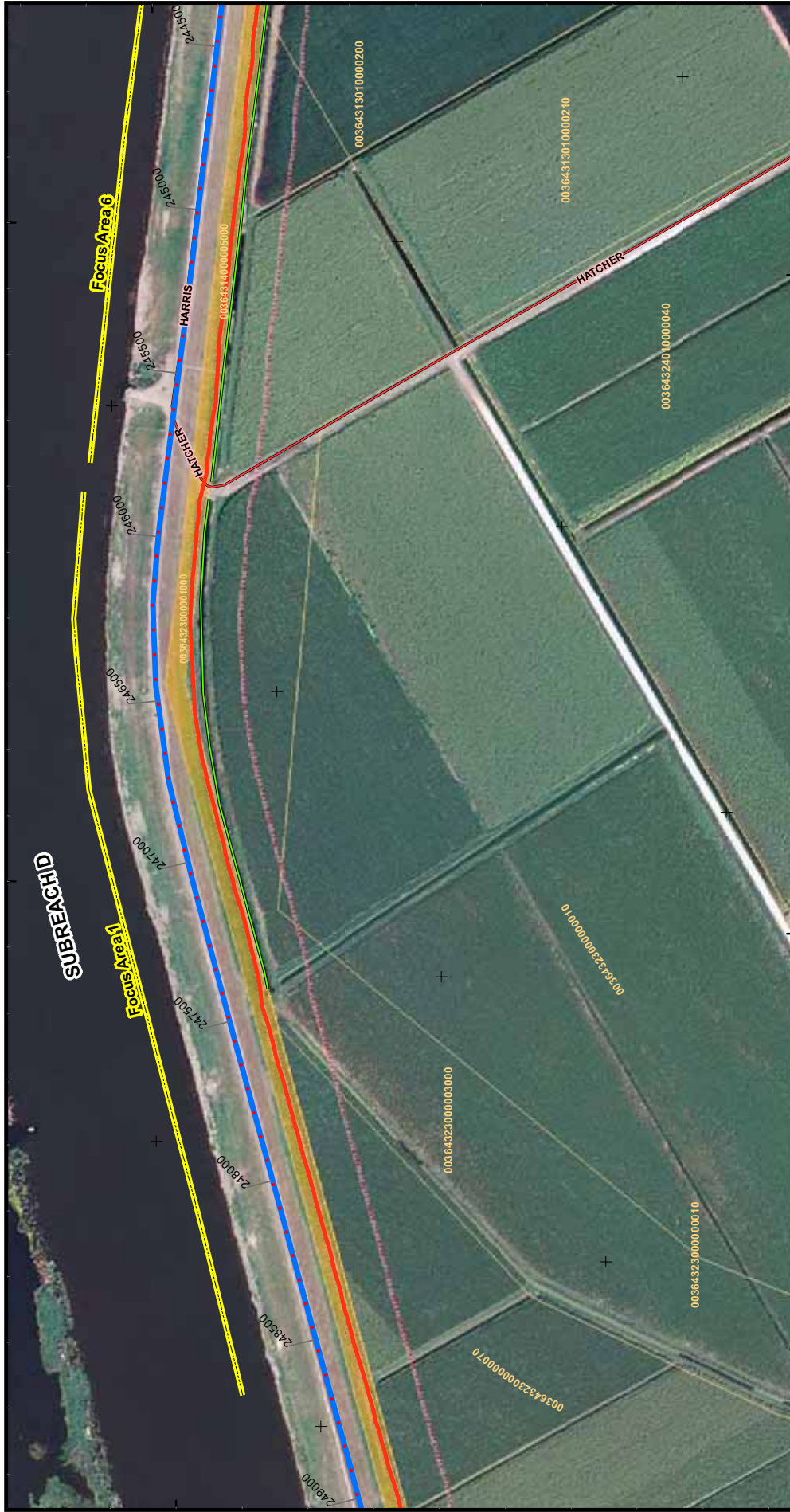
HERBERT HOOVER DIKE Reach1 Sheet 26



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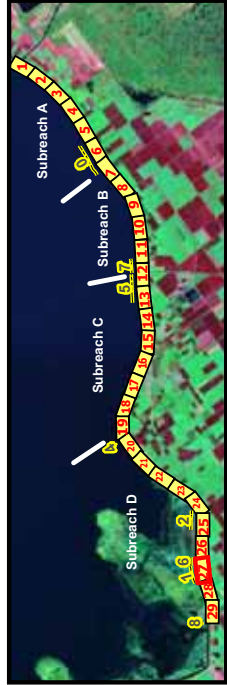
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Legend

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- Toe Ditch
- Toe of Dike

Focus Areas

150 Ft. Out from toe

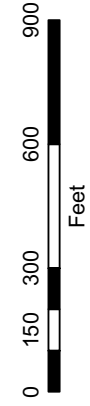
Ownerships

ROW



US Army Corps
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Jacksonville District

HERBERT HOOVER DIKE Reach1 Sheet 27



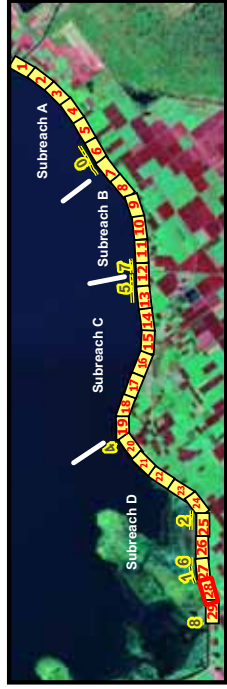
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751000

750000



753000



File Name: mapbook_reach1_all_offsets20070501.mxd Print Date: 01 May 2007

Legend

123000 Stationing Number

Crest of Dike

Toe Ditch

Toe of Dike

Focus Areas

150 Ft. Out from toe

Ownerships

ROW



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Jacksonville District

HERBERT HOOVER DIKE Reach1 Sheet 28



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HERBERT HOOVER DIKE

Reach1 Sheet 29

Legend

123000	Stationing Number	Focus Areas
	Crest of Dike	
	Toe Ditch	
	Toe of Dike	

150 Ft. Out from toe

Ownerships

ROW

0 150 300 600 900

Feet

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US Army Corps of Engineers
Jacksonville District

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APPENDIX D

PERTINENT CORRESPONDENCE

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

RECEIVED

20 Apr 2007

April 17, 2007

Mr. Stuart J. Appelbaum
Chief, Planning Division
U.S. Army Corps of Engineers
Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

ATTN: Ms. Nancy Allen

SUBJ: EPA NEPA Comments on the COE's EA for the "Herbert Hoover Dike Major Rehabilitation, Reach 1 Seepage Berm and Reach 1A Test Cutoff Wall"; Martin and Palm Beach Counties, FL

Dear Mr. Appelbaum:

Consistent with our responsibilities under Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the subject U.S. Army Corps of Engineers' (COE) Environmental Assessment (EA) for the subject rehabilitation to Reach 1 (seepage berm) and Reach 1A (cutoff wall) of the Lake Okeechobee Herbert Hoover Dike (HHD).

We have limited our comments to project wetland impacts. We offer the following comments:

* Pg 23 - 4.1.1 Wetlands: The EA refers to the project requiring 12.8 acres of compensatory mitigation. Per the Uniform Mitigation Assessment Method (UMAM), the document should correct "acres" to "functional units" and state "Applying the UMAM it was calculated that 12.8 functional units would be necessary to offset project impacts."

* Pg 32 - Table 4-1, Environmental Consequences of the Proposed Alternatives (Wetlands): The table states 40.5 acres of wetland impacts, while the text on page 23 (4.1.1 Wetlands) states 40.2 acres. The text on page 40 (4.3.2.2 Natural Environment) states "The recommended plan for Reaches 2 and 3 would result in filling up to 40.5 acres of wetlands." However, the DEIS for HHD Reaches 2 and 3 dated December 2006, lists wetland impacts of 229.5 acres. Please provide the correct acreage of impacts by reach and section.

* Pg 37 - 4.2 Environmental Consequences of Previously Considered Alternatives: Environmental Components (Wetlands): Alternative 2 proposes a cutoff wall that "...may reduce water supply to landward wetlands nearest the HHD." The preferred plan in the EA also proposes to install a cutoff wall, which may reduce water supply to

wetlands landward of the project footprint. Therefore, additional mitigation may be necessary to offset secondary impacts to any wetlands located outside the footprint of the project due to a reduction in hydrology.

* Appendix C, Section C-1, UMAM Calculations: The EA refers to the fact that implementation of the preferred project would result in 12.8 acres of functional loss. As suggested above, UMAM impacts are quantified in "Functional Loss" and Mitigation is quantified in "Relative Functional Gain", as opposed to acres.

* Appendix C, Table C-1 Mitigation Necessary: The table lists "Wetland Value" in acres. Again, "acres" should be "functional units". In addition, the table lists 3.8 functional loss units necessary to offset impacts due to the "Toe Ditch Emergency Work". Please provide information as to where those impacts occurred within the 16 UMAM assessment areas listed in Table C-1. If the "Toe Ditch Emergency Work" area is not part of the 16 UMAM areas scored in Table C-1, proposed wetland impacts for the Reach 1 project (16 UMAM assessment areas and emergency work area) will result in a functional loss of 20.4 units (16.6 units for the 16 UMAM areas and 3.8 units for the emergency work area). Total mitigation for the removal of 57 acres of Melaleuca was calculated to create 17.1 mitigation credits. Therefore, the proposed project will require an additional 3.3 units of mitigation credit to offset 20.4 units of functional loss.

* Appendix C, UMAM sheet for Subreach A-1TD: Functional loss is listed as 0.4 and should be 0.5.

EPA appreciates the opportunity to provide these comments on the EA. Should you have questions, feel free to contact Chris Hoberg of my staff at 404/562-9619 (or hoberg.chris@epa.gov) for NEPA issues or Ron Miedema at 561/616-8741 (or miedema.ron@epa.gov) of the Water Management Division at the EPA South Florida Office for wetland issues.

Sincerely,



Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management



United States Department of the Interior

U. S. GEOLOGICAL SURVEY

Reston, VA 20192

In Reply Refer To:
Mail Stop 423

APR 16 2007

Ms. Nancy Allen
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Subject: Environmental Assessment for the Herbert Hoover Dike Major Rehabilitation, Martin and Palm Beach Counties, Florida

Dear Ms. Allen:

As requested by your correspondence of March 28, 2007, the U.S. Geological Survey (USGS) has reviewed the subject environmental assessment (EA) and offers the following comment.

SPECIFIC COMMENT

Section 4.1.3 Water Resources, Alternative No. 5, page 26, first sentence

This section indicates that the cutoff wall for alternative 5 is expected to have no effect on ground water; however, the reasons stated are inconsistent with information given elsewhere in the document. The information provided in the first bullet seems to contradict information provided on page 15, which indicates that alternative 2 was not selected in part because the cutoff wall would have possible effects on the local ground-water regime. The two walls differ only slightly in total depth -- the wall in alternative 2 is 60 ft. deep with the top at an approximate elevation of 25 ft. (i.e., the bottom tip would extend to the approximate elevation of -35 ft.), while the wall in alternative 5 has a bottom tip at the approximate elevation of -20 to -30 ft. In addition, the illustrations for both alternatives show walls that extend a few feet into the sand below the bottom of the limestone layer. The text should explain the fundamental difference between the two walls that accounts for the potential effects of the alternative 2 wall on shallow ground water and the anticipated lack of similar potential effects of the alternative 5 wall.

USGS #1

The second bullet indicates that there is a relatively impermeable barrier at -200 ft. It can be assumed that the intent of this statement is to indicate that this barrier protects the deeper Floridan aquifer, which serves as the primary source of public water supply in the region. However, the lack of potential effects on the deeper aquifer does not remove concern for potential effects on local, shallow ground-water resources. In the last paragraph on page 19, it is stated that ground water in the area occurs within about 3 ft. of land surface and that this shallow

USGS #2

ground water supports local habitat and the species that depend on this habitat as well as agriculture.

Thank you for the opportunity to review and comment on the EA. If you have any questions concerning our comment, please contact Lloyd Woosley, Chief of the USGS Environmental Affairs Program, at (703) 648-5028 or at lwoosley@usgs.gov.

Sincerely,

A handwritten signature in dark ink, appearing to read "James F. Devine". The signature is fluid and cursive, with a large initial "J" and "D".

James F. Devine

Senior Advisor for Science Applications

May 2, 2007

Stuart J. Appelbaum
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2007-FA-0675
Date Received: April 3, 2007
Project: Herbert Hoover Dike Major
Rehabilitation
Counties: Palm Beach and Martin

Dear Mr. Appelbaum:

The Fish and Wildlife Service (Service) has reviewed additional information submitted in an Environmental Assessment (EA) by the U.S. Army Corps of Engineers (Corps), dated April 28, 2007, proposing further work in Reach 1A and Reach 1 of the Herbert Hoover Dike (HHD). This EA covers the Herbert Hoover Dike Major Rehabilitation for the Reach 1 Seepage Berm and Reach 1A Test Cutoff Wall. Reach 1 is located in Palm Beach and Martin Counties, extending from the St. Lucie Canal at Port Mayaca, south to the Hillsboro Canal at Belle Glade. The proposed project area is approximately 22.5 miles along the HHD. The Flood Control Act of 1948 provided authority to construct the dike and authorized repairs and modifications.

The recommended plan for rehabilitation of the HHD consists of an integrated solution that addresses internal erosion, slope stability, and foundation vulnerabilities. The proposal includes two main features; a Reach 1 seepage berm and a Reach 1A partially-penetrating cutoff wall. All work under this EA will be conducted within the Corps' existing right of way (ROW). On March 13, 2007, an interagency team of biologists from the Corps, the Environmental Protection Agency, The Florida Department of Environmental Protection, and the Service conducted an inspection of the subject reach, discussed ongoing modifications to the previously proposed design, and used the Uniform Mitigation Assessment Method (UMAM) to evaluate the quality of wetlands potentially affected by the proposed work.

The UMAM evaluation was conducted on Reach 1 to determine the functional units of the habitat to be affected. The team scored the area 150 ft. from the toe of the dike. However, this EA only covers work within the ROW. A future EIS will cover work outside of the ROW once the Corps has a project design for that area and has determined real estate acquisition needs.

The Corps has determined that a total of 16.6 functional units of wetland value will be impacted by the Hebert Hoover Dike project for Reach 1. This wetland value, minus credits (3.8 units) from the emergency toe ditch work already completed on the previous project phase, nets a total loss of 12.8 functional units. The Corps wishes to apply available mitigation credits (13.3 units) from the melaleuca removal project conducted in a previous project segment to cover this additional wetland impact.

If the current plans discussed by the project engineer, Jacob R. Davis, and the environmental lead, Nancy P. Allen, are approved; the Corps may further reduce potential impact on wildlife resources. In addition, certain proposed design changes may result in restored wildlife habitat and an increased amount of aquatic habitat. Because construction would be confined to the existing footprint, environmental impacts would be minimal. Impacts caused by filling wetlands along the toe ditch have been mitigated on and off site. No other long-term adverse effects of the project are anticipated.

We greatly appreciate your cooperation in this rehabilitation project and thank you for your support in the effort to protect important natural resources. If you have any questions regarding this project, please contact Agustin P. Valido at 772-562-3909, ext. 298.

Sincerely yours,

Paul Souza¹
Field Supervisor
South Florida Ecological Services Office

cc:

Corps, Jacksonville, Florida (Nancy Allen)
Corps, Jacksonville, Florida (Jacob R. Davis)
FWC, West Palm Beach, Florida (Chuck Collins)
EPA, West Palm Beach, Florida (Ron Miedema)
Service, Jacksonville, Florida (Miles Meyer)

¹ *Note: USFWS has indicated that this letter is a formality, as their previous concurrence has not changed.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960



November 24, 2006

Stuart J. Appelbaum
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Appelbaum:

The Fish and Wildlife Service (Service) has reviewed the additional information submitted by the U.S. Army Corps of Engineers (Corps), dated October 4, 2006, regarding a technical review report on Herbert Hoover Dike (HHD) Major Rehabilitation Project that included recommendations for urgent repairs to Reach 1A. The Corps has suspended construction of the previously selected plan (bench and cutoff wall) and wants to begin the toe ditch repairs quickly, in anticipation of the 2007 rainy season. A review group of Corps' engineers recommended depositing and compacting sand and gravel in the levee toe ditch and building up a berm over the ditch. The purpose of the work is to stabilize the outer toe of HHD and prevent further deterioration. This letter represents the Service's view of the effects of the proposed action in accordance with section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*) and the provisions of the Fish and Wildlife Coordination Act of 1958, as amended (FWCA) (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

FISH AND WILDLIFE COORDINATION ACT

The proposed modifications are very similar to a component of the alternatives originally considered for HHD repair in the 1999 Draft EIS, and previously addressed in our Final FWCA report dated December 20, 2001, and in our previous supplemental FWCA reports, dated March 4, 2003, and March 8, 2004. Since the Corps had documented the proposed fill in the 1999 draft EIS, and subsequently carried out the mitigation actions for wetlands losses, and the revised design appears to avoid further impacts to wetlands, no additional mitigation will be required. However, if modifications are made to the project design that potentially impact wetland habitat, further evaluation may be required under the FWCA.

THREATENED AND ENDANGERED SPECIES

The Service concurred on June 9, 1999, with the Corps' determination that the project was "not likely to adversely affect" the threatened bald eagle (*Haliaeetus leucocephalus*) or the threatened eastern indigo snake (*Drymarchon corais couperi*). We must remind you the Corps' proposed measures to avoid adverse effects to the bald eagle and the eastern indigo snake remain in effect.

Our field inspections indicated the consistent presence of a bald eagle along the HHD between Canal Point and Pahokee at about Mile 10, measuring south from Port Mayaca. This was noted in our draft FWCA reports, dated February 11, 2000, and March 8, 2004. The Corps must search

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the area for bald eagle nests prior to construction to avoid construction activities that may disrupt nesting. In addition, prior to project construction, the contractor will instruct all personnel associated with the project that endangered species may be present in the area, and the need to avoid harming, harassing, or killing these species and the civil and criminal consequences. Construction activities must be kept under surveillance, management, and control to minimize any interference, disturbance, or impact to these resources.

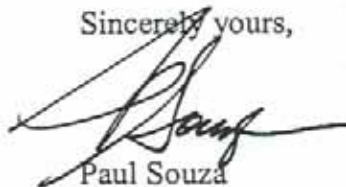
On October 5, 2006 an interagency team composed of Corps staff, an Engineer from the Florida Department of Environmental Protection, Corps contract staff, and a Service biologist conducted an inspection of Reaches 1, 3, and 2 with project engineer Jacob R. Davis. We discussed the subject modifications to the plan now included for urgent repairs to Reach A.

It appears the subject repairs will not further impact wildlife with the exception of temporary impacts associated with construction. We are delighted to see the effort the Corps' project engineer has made to minimize potential impacts on wildlife resources. In addition, we have noticed sensitivity analysis has been performed for Reach A to determine the nature and amount of backfill materials used in these repairs. We continue to encourage Corps' engineering staff to perform this analysis for each identified section to determine the total length of the portion of the toe ditch that needs to be backfilled. The Corps can further limit project cost and also environmental impacts as the project proceeds to detailed design.

Based on our review of the information provided regarding the recommendations for urgent repairs to Reach A and the Corps' continued acceptance of measures to avoid adverse effects to the bald eagle and the eastern indigo snake, we find there is no need to reinitiate consultation at this time. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, if a new species is listed, or if designated critical habitat may be adversely affected by the project, reinitiation of consultation may be necessary.

We greatly appreciate your cooperation in this planning effort and thank you for your support in protecting significant fish and wildlife resources. If you have any questions regarding this project, please contact Agustin P. Valido at 772-562-3909, extension 298.

Sincerely yours,



Paul Souza

Field Supervisor

South Florida Ecological Services Office

cc:

Corps, Jacksonville, Florida (Nancy Allen)

Corps, Jacksonville, Florida (Jacob R. Davis)

FWC, West Palm Beach, Florida (Chuck Collins)

FDEP, West Palm Beach, Florida (Stan Ganthier)

Service, Jacksonville, Florida (Miles Meyer)



Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

April 30, 2007

Ms. Nancy P. Allen
Planning Division, Jacksonville District
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers -
Environmental Assessment - Herbert Hoover Dike Major Rehabilitation,
Reach 1 Seepage Berm and Reach 1A Test Cutoff Wall - Martin and
Palm Beach Counties, Florida.
SAI # FL200704023204C (Reference SAI # FL200612122959C)

Dear Ms. Allen:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16, U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the subject Environmental Assessment (EA).

The Florida Department of Environmental Protection (DEP) continues to support the Corps of Engineers' plans to expedite the repair and rehabilitation of the dike in order to ensure the continued protection of lives and property in the communities around the lake and notes that the Corps of Engineers is obtaining the required DEP permits/ water quality certifications to construct the selected plan. Though the Lake Okeechobee Trail (LOST) is mentioned on Table 4-1, Environmental Consequences of the Proposed Alternatives, staff recommends that the Affected Environment Section 3, paragraph 3.5 (Recreation) also mention the segment of the LOST located in Reach 1 of the dike. In addition, please clarify the statement that the "haul road" will be "PAVED" where the haul road is referenced in relation to the LOST trail on pages 28 and 34. Please reference the DEP's comments, provided on January 12, 2007, concerning the LOST and request to initiate discussions regarding the post-

Ms. Nancy P. Allen
April 30, 2007
Page 2 of 3

construction repair of any trail damage. For further recommendations and comments, please see the enclosed DEP memorandum.

The Florida Department of Transportation (FDOT) District Four has provided the following comments:

1. Please label all the adjoining roadway and railroad facilities on the individual maps provided in Appendix C under the Herbert Hoover Dike Reach 1 Maps. This detail is necessary to ensure all potential impacts related to transportation infrastructure are documented and addressed in the NEPA document.
2. Under Section 4 in the Environmental Components - Land Use Transportation, the EA documents indicate that there are "no significant impacts to transportation features expected." However, there was no further discussion that could be found in the document related to these impacts. FDOT understands that the preferred alternative may not have a direct impact on these transportation facilities, but it may indirectly impact them by the proposed filling of the adjacent drainage swale, which should be addressed.
3. As noted in the EA document, any impact to the existing LOST will be coordinated with both FDOT and DEP in order to return the trail to pre-existing conditions and limit trail closure time. As these studies continue for this repair work, we ask that all related impacts to LOST be completely documented in the related NEPA report with information as to how they will be fully mitigated to its current condition. Any temporary trail closure during the rehabilitation should be accompanied with appropriate signing and public notices.

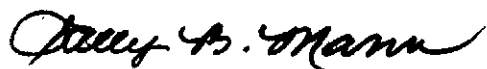
Further questions should be addressed to Ms. Amie Goddeau, District Four SIS Coordinator, at (954) 777-4343.

Based on the information contained in the EA and the enclosed state agency comments, the state has determined that, at this stage, the proposed activities are consistent with the Florida Coastal Management Program (FCMP). The concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final review of the project's consistency with the FCMP will be conducted during the environmental permitting stage.

Ms. Nancy P. Allen
April 30, 2007
Page 3 of 3

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

A handwritten signature in black ink that reads "Sally B. Mann". The signature is written in a cursive style with a large, stylized 'S' and 'M'.

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

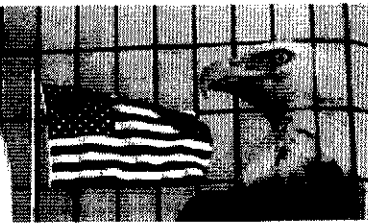
cc: John Outland, DEP, MS 45
Shelley Yaun, DEP, MS 3560
Tim Gray, DEP, Southeast District
Jena Brooks, DEP, OGT
Lisa Stone, FDOT



Florida

Department of Environmental Protection

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Project Information	
Project:	FL200704023204C
Comments Due:	04/23/2007
Letter Due:	04/30/2007
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - ENVIRONMENTAL ASSESSMENT - HERBERT HOOVER DIKE MAJOR REHABILITATION, REACH 1 SEEPAGE BERM AND REACH 1A TEST CUTOFF WALL - MARTIN AND PALM BEACH COUNTIES, FLORIDA.
Keywords:	ACOE - HHD REHAB, REACH 1 SEEPAGE BERM/TEST CUTOFF WALL - MARTIN/PALM BEACH CO.
CFDA #:	12.106
Agency Comments:	
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	
<p>The DEP continues to support the Corps of Engineers' plans to expedite the repair and rehabilitation of the dike in order to ensure the continued protection of lives and property in the communities around the lake and notes that the Corps of Engineers is obtaining the required DEP permits/water quality certifications to construct the selected plan. Though the Lake Okeechobee Trail (LOST) is mentioned on Table 4-1, Environmental Consequences of the Proposed Alternatives, staff recommends that the Affected Environment Section 3, paragraph 3.5 (Recreation) mention the segment of the LOST located in Reach 1 of the dike. Also, please clarify the statement that the "haul road" will be "PAVED" where the haul road is referenced in relation to the LOST trail on pages 28 and 34. Please see the DEP's comments, provided on January 12, 2007, concerning the LOST and request to initiate discussions regarding the post-construction repair of any trail damage. For further recommendations and comments, please refer to the enclosed DEP memorandum.</p>	
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION	
NO COMMENT BY JOE WALSH ON 4/11/07.	
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION	
<p>The FDOT has the following comments regarding the HERBERT HOOVER DIKE MAJOR REHABILITATION, REACH 1 SEEPAGE BERM AND REACH 1A TEST CUTOFF WALL. 1. Please label all the adjoining roadway and railroad facilities on the individual maps provided in Appendix C under the Herbert Hoover Dike Reach 1 Maps. This detail is necessary to ensure all potential impacts related to transportation infrastructure are documented and addressed in the NEPA document. 2. Under Section 4 in the Environmental Components - Land Use Transportation, the EA documents indicate that there are "no significant impacts to transportation features expected." However, there was no further discussion that could be found in the document related to these impacts. We understand that the preferred alternative may not have a direct impact on these transportation facilities, but it may indirectly impact them by the proposed filling of the adjacent drainage swale which should be addressed. 3. As noted in the EA document, any impact to the existing Lake Okeechobee Scenic Trail (LOST) will be coordinated with both FDOT and FDEP in order to return the trail to pre-existing conditions and limit trail closure time. As these studies continue for this repair work, we ask that all related impacts to LOST be completely documented in the related NEPA report with information as to how they will be fully mitigated to its current condition. Any temporary trail closure during the rehabilitation should be accompanied with appropriate signing and public notices. Further questions should be addressed to Ms. Amie Goddeau, SIS Coordinator, at (954) 777-4343.</p>	
SOUTH FLORIDA WMD - SOUTH FLORIDA WATER MANAGEMENT DISTRICT	
Released Without Comment	
TREASURE COAST RPC - TREASURE COAST REGIONAL PLANNING COUNCIL	
The proposed project is not in conflict or inconsistent with the Strategic Regional Policy Plan.	
MARTIN - MARTIN COUNTY	
PALM BEACH -	
STATE - FLORIDA DEPARTMENT OF STATE	
No Comments Received	

Memorandum



TO: Florida State Clearinghouse

THROUGH: Greg Knecht, Administrator *SK for GK*
Water Quality Standards & Special Projects Program

FROM: John Outland, Stan Ganthier

DATE: April 18, 2007

RECEIVED

APR 23 2007

OIP / OLGA

SUBJECT: USACE, Environmental Assessment for the Herbert Hoover Dike, Reach 1 Seepage Berm and Cutoff Wall, Martin and Palm Beach Counties, Florida

SAI #: FL07-3204C

The Department has reviewed the above-referenced Notice of intent and offers the following comments:

Background

Comments on the Draft Environmental Assessment for Reach 1 were provided on January 12, 2007.

The Corps is currently finalizing the modified design in Reach 1 and completing priority toe ditch repairs in Reaches 1, 2, and 3 as authorized by DEP Permit No. EI 0234604-003. The subject Environmental Assessment (EA) and Finding of No Significant Impact concludes that the proposed action, an integrated solution consisting of a seepage berm and a partially-penetrating cutoff wall, will not significantly harm the quality of the human environment and does not require an Environmental Impact Statement.

The proposed project is not expected to have adverse affects on listed species. The Corps is obtaining the required permits from the Department to construct the selected plan.

Comments

1. In Section 1.8, the Corps lists the water quality certificates currently in effect for dike repairs. This list should include the Deminimus exemption (DEP File No. 0234604-002) that may be used for constructing the seepage cutoff wall in Reach 1D.
2. Figure 2-3 does not depict the current designs for the typical cross-sections of the partial and full seepage berm. The Corps should update this figure with the latest designs.
3. The Affected Environment Section 3, paragraph 3.5 (Recreation), fails to mention the segment of the Lake Okeechobee Trail (LOST) located in Reach 1 of the dike.

However, the LOST is mentioned on Table 4-1, Environmental Consequences of the Proposed Alternatives, where it is acknowledged that some effects to the paved portions of the trail are expected during project construction and those construction activities may limit access to certain parts of the trail, and parts of the trail may be removed.

Table 4-1 also provides that the Corps' will attempt to refine the project design to minimize impacts to the trail and will explore the use of their Section 111 authority of the 1958 Rivers and Harbor Act, P.L. 85-500, to determine if it is appropriate to pay for the cost to remediate impacts to the LOST with project funds. Please clarify the statement that the "haul road" will be "PAVED" where the haul road is referenced in relation to the LOST Trail on page 28, 4.1.5., item 2, and page 34 Alternative 5, item 2.

4. In Section 4.10, Environmental Commitments, the Corps summarizes protective measures that will be taken for the bald eagle, eastern indigo snake, burrowing owl, and Okeechobee gourd. This section should also mention protective measures for the wood stork, snail kite, and crested caracara.

The Department supports the Corps' intention to expedite the repair and rehabilitation of the dike to ensure the continued protection of lives and property in the communities around the lake. We recognize that the Corps' is accelerating the work in Reaches 1, 2 and 3 and will move forward with the remaining work as soon as possible.

Please see Department comments provided on January 12, 2007 concerning the LOST and our request to initiate discussions with the Corps' to determine a reasonable course of action to address the post-construction repair of any damage to the trail. It is recommended that the Corps and the Department continue to communicate and work cooperatively to facilitate the Dike's rehabilitation while also protecting the environment.

cc: John Outland (cc)
Frank Nearhoof (cc)
Tim Gray (cc)
Chad Kennedy (cc)

To whom it may concern.

I have the following objections and comments about your report on the dike and the surrounding area

Page vii Para g.

There is no consistency to the elevations of the varying 'soils' (muck is not considered soil but rather varying types of humus) around the lake. For example the depths of the 'muck' can vary between -6 to -11 feet sea level.

Page vii Para i

There are both anecdotal references to and proven and located sites of Calusa, Seminole Indian and early military sites all along the shore line of Lake Okeechobee. This also includes the locations of numerous 'lost' rivers which are important to understanding both the history and the underlying geology of the area.

Page x Second Para, Last sentence

How will you mitigate the lost of 'muck' soils?

I asked a soil specialist and he told me that the only way to mitigate this would be plant indigenous and native plants and flood the land to be mitigated for a thousand years.

Page 3 Para 1.3

Soils and piping into the sand layer are necessary to the protection of the deep 'muck' (Torry Island, Terra Ceia and Poker series) soils located along the eastern edge of the Lake Okeechobee Ridge, which exist throughout Reach 1a though 1d

Page 6 Para 1.7

In an area full of unique soil 'muck' types and farming practices, why was there not any consultation with with the USDA and NRCS ?

Page 9 Para 2.1.2

Possibly the most irritating comment in this in this document is the the comparison of the area to the New Orleans Levees and Hurricane Katrina. The geology, the geography in fact the history of storms that have attacked this area is totally different than the New Orleans' area. We have been hit more often by more severe storms than New Orleans and other than in 1926 and 1928 the dike in all its incarnations has not failed.

Page 17 Figure 2-7

Minor comment- the poles have been off the dike for over 6 months.

Pages 19 & 20 Para 3.3 Sentence beginning: 'The Principal source.....'

The primary source of ground water of the area located with in the first several hundred yards next to the Dike is seepage under the Dike and the Lake Okeechobee Ridge. This is especially important as the elevation of the lands close to the Ridge is quite a bit higher than those away from the Ridge and farther east.

Page 21 Para 3.5 First Paragraph

You did not mentioned any thing in the Area around Canal Point, The correct name for the the park on the Lake front is 'Canal Point Lion's Club Park' At this site and up and down the Palm Beach Canal for a 1/4 mile is used year round by fishermen and boating.

In fact during the fishing season you can find more fishermen between Canal Point and Port Mayaca than you can any where else

Second Para

There have only been a couple of biking events on the top of the Dike. Every year there is a biking event on the highways next to the Dike. The local chapter of the Florida Trails has a yearly event around Thanksgiving.

Page 21 Para 3.6

There are 7 not 5 access points to the Lake in the area under discussion.
Going from North to South

1. Port Mayaca
2. Canal Point Lions Club Park
3. East Beach Road
4. Pahokee Marina
5. Jones Pump House
6. Rardin Park
7. Belle Glade Marina

There is another access where the barge loading platform was located.

Pages 24 thru 26

There is a population of Florida Tree Snails that was introduced to the area in the late 40's by my father. they exist along the Lake Okeechobee Ridge from the the area know as Sand Cut to into Pahokee.

Page 26 Para 4.1.3 Alternative 5 para

As I stated previously, How Do You Know This? Nowhere in this report is there any reference to any individual that has any knowledge of the 'muck' soils or of the farming practices of the area.

Page 27 Para 4.1.3 Last para.

How will mitigate oxidation of the 'muck' soils?

Page 27 Para 4.1.4 Alternative 5 first para

Have you contacted the Palm Beach County Historical Resources Review Board, the Palm Beach Historical Society, the Palm Beach County Archaeologist?

Page 28 Para 4.1.5 Recreational Resources Alternative 5 para 3.

I have been involved in local eco-tourism efforts and the development of the Lake Okeechobee Scenic Trail for the last twenty years. I would like to know that effort of me and many others was not for nothing. I find 'will explore' and 'to determine if it is appropriate' infuriating at best.

Page 31

No mention of Florida Tree Snails

Page 33 Historic Properties

See previous comments about the wealth of sites along the shoreline and Ridge as well as coordination with local resources.

Page 34 Recreation

See previous comments about public access points, fishing, and the use of the Lake Okeechobee Scenic Trail and its restoration.

Page 35 Socio Economics

No mention of Loss of Land (oxidation) homes and the stress caused by the why this entire issue has been handled. Plus the damage that the lack of firm information is doing to any attempts to develop the potential of the area.

Page 35 Public Health and Safety

The damage of a 'possible' breach of the dike as compared to the daily stress caused by lack of knowledge and the real threat or loss of homes, land and jobs.

This stress is a long term and recognized issue that has grown out of any governmental involvement in the lives of Glades residents. No one agency is solely responsible for this extremely defensive attitude, but it does exist. I refer you to a recent document that shares some common ground with your current report. Although this document points to racial attitudes as part of the problem, speaking as a life long resident it is more of an attitude, 'It is us (Glades Residents) against them (outsiders)

'Herbert Hoover Dike: Emergency Evacuation Guidance Document: Draft 3 July 14, 2006

Page 38 Public Education and Outreach Plan:

second para

Page 36 thru 38

Until the issues I have raised in all the above have been addressed, I cannot comment on any of the conclusions drawn on these pages.

Page 42 Para 4.5 Topography, Geology and Soils

I strongly disagree. How can you say this when you do not know. Y have indicated your lack of certainty in this issue is this report.

Page 42 Para 4.5 Water Resources

I strongly disagree. How can you say this when you do not know. Y have indicated your lack of certainty in this issue is this report.

Page 44 Recreation Resources para 3 and Page 46 para beginning '* The Corps will

Same objections as raised earlier about the demolition of the Lake Okeechobee Scenic Trail

Page 49 Para 4.11.8

You have already stated that you do not what will happen when you cut off the ground water to the 'muck' soils next to the Lake Okeechobee Ridge. The 'muck' is unique. the micro climate that exists along the eastern shore of the Lake is unique.

Page 52

Why was this document not reviewed by anyone familiar with the geology, soils and farming practices that exist around the Lake.

Sincerely Yours'

Roswell Harrington
PO Box 127
Canal Point, fl. 33438
phone 561-755-0114
e-mail: roswell_harrington@yahoo.com



**US Army Corps
of Engineers®**

Jacksonville District